STATISTICAL SUMMARIES OF SELECTED IOWA STREAMFLOW DATA THROUGH SEPTEMBER 1996

by Edward E. Fischer *and* David A. Eash

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CONVERSION FACTORS, ABBREVIATIONS, AND VERTICAL DATUM

Multiply	By	To obtain
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

Sea Level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

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ABSTRACT

Statistical summaries of streamflow data collected at 156 streamflow-gaging stations in Iowa are presented in this report. All gaging stations included for analysis have at least 10 years of continuous record collected before or through September 1996. The statistical summaries include (1) statistics of monthly and annual mean discharges; (2) monthly and annual flow durations; (3) magnitudes and frequencies of instantaneous peak discharges (flood frequencies); and (4) magnitudes and frequencies of high and low discharges. Also presented for each gaging station is a graph of the annual mean flows and, for most stations, selected values from the most-recent stage-discharge rating table.

INTRODUCTION

Information concerning streamflow characteristics is essential for the development and management of surface-water resources. Statistical analyses of streamflow data provide information about the spatial and temporal characteristics of streamflow. Project designers, water- and land-use managers, and hydrologists need information on all aspects of streamflow to evaluate various hydraulic and hydrologic designs or land-use alternatives.

This report presents statistical summaries of streamflow data for 156 streamflow-gaging stations that have at least 10 years of continuous record collected before or through September 1996. The gaging stations are located in Iowa except for three Missouri River stations that are located in Nebraska. The previous Iowa streamflow statistics report presented summaries for 144 stations that had data collected before or through September 1988 (Fischer and others, 1990); thus, the present report reflects the addition of 12 stations and the collection of eight more years of record at active stations.

The statistical summaries presented for each gaging station are (1) statistics of monthly and annual mean discharges; (2) monthly and annual flow durations; (3) magnitudes and frequencies of instantaneous peak discharges (flood frequencies); (4) magnitudes and frequencies of annual high and low discharges; and (5) magnitudes and frequencies of seasonal low discharges. Also presented for each station is a station description, a graph of the annual mean flows and, for most stations, selected values from the most-recent stage-discharge rating table.

Users of this report are responsible for the suitability and applicability of the statistics to their requirements.

USGS STREAMFLOW-GAGING NETWORK IN IOWA

The U. S. Geological Survey (USGS) is the primary Federal agency responsible for the collection of the Nation's streamflow data. In 1995, the USGS streamflow-gaging network comprised 7,185 gaging stations throughout the United States (Lew and Dodds, 1996, p. 4). In Iowa, the network comprised 119 stations in 1995 and 118 stations in 1996.

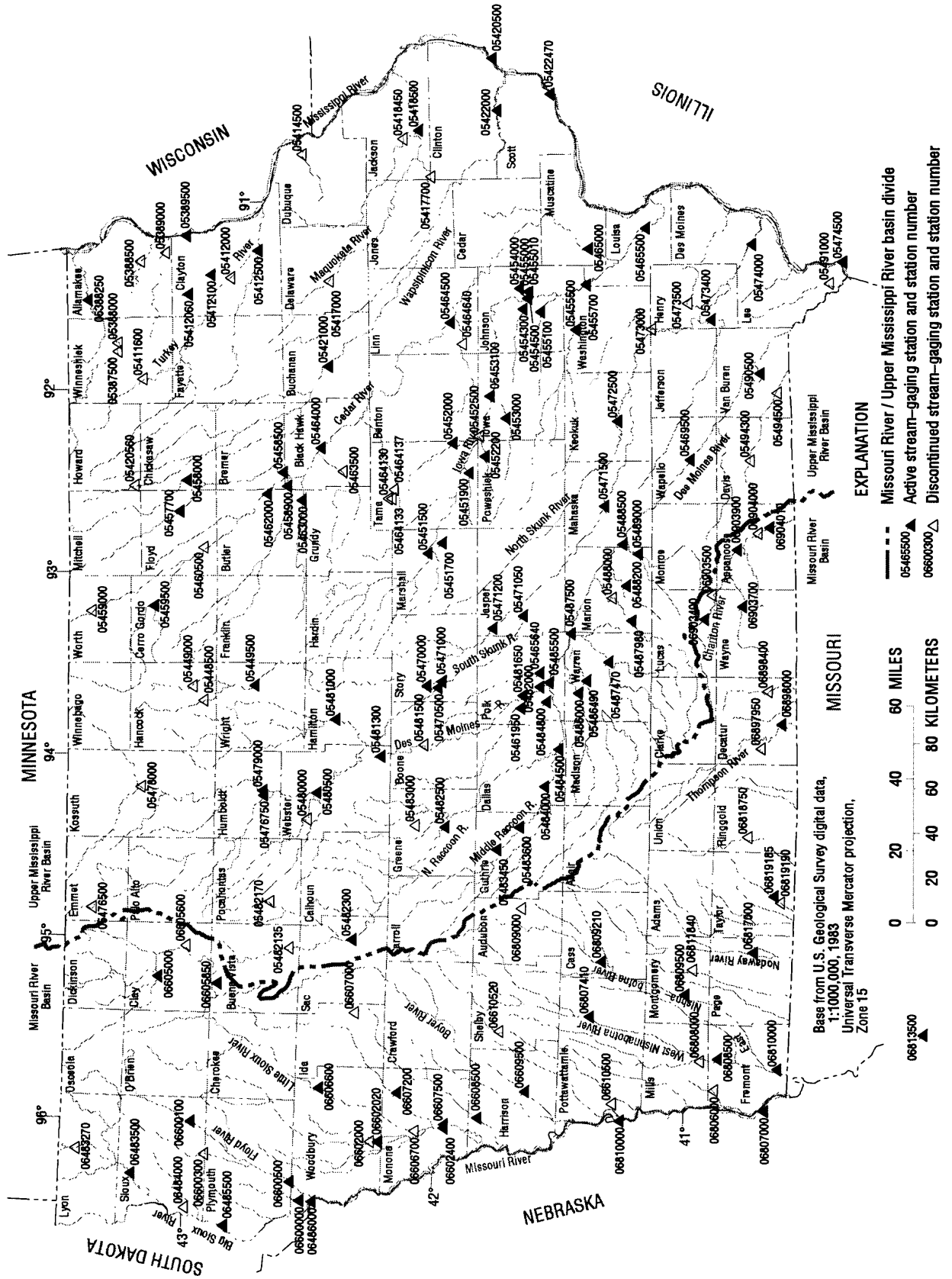


Figure 1. USGS stream-gaging stations for which statistical summaries are calculated in this report.

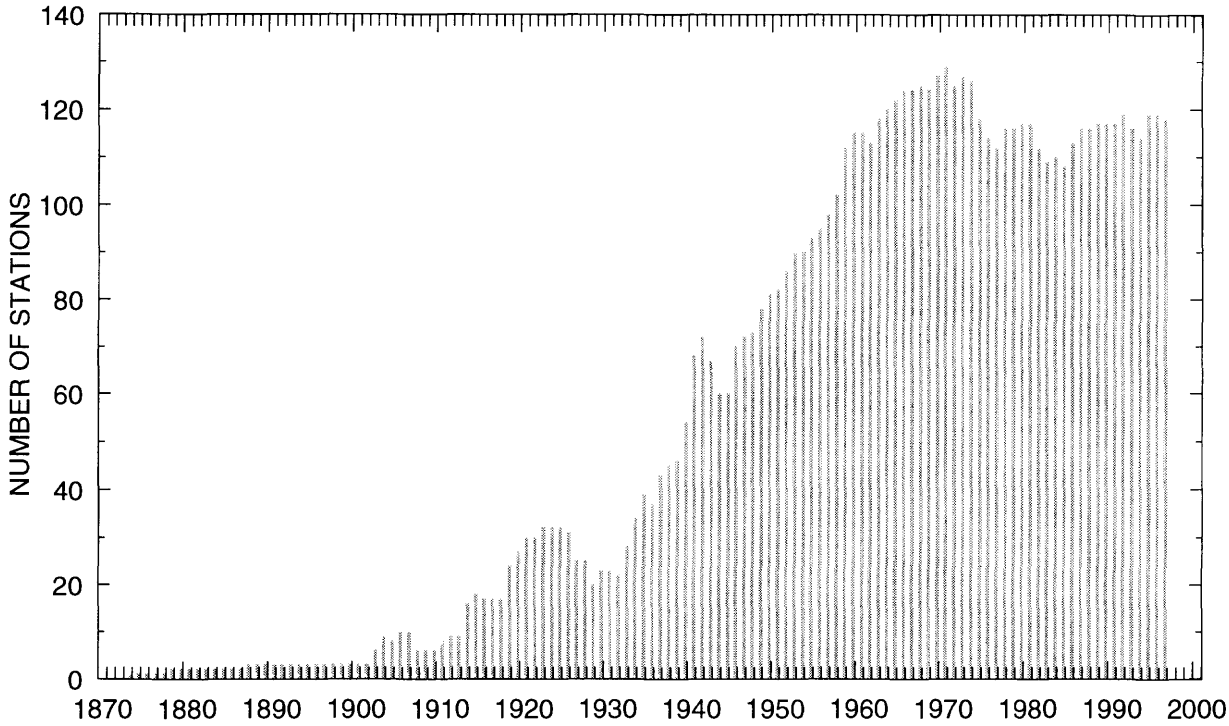


Figure 2.--Number of Iowa streamflow-gaging stations operated each water year, 1873—1996.

The first systematic collection of streamflow data in Iowa was made in 1873 when the USGS began collecting data at Mississippi River at LeClaire, Iowa (not shown). Another gaging station was installed in 1878 at Mississippi River at Keokuk (fig. 1, station 05474500) and in 1879 at Missouri River at Sioux City (station 06486000). The gages at Keokuk and Sioux City are still active stations in the Iowa streamflow-gaging network.

The USGS established 10 stations on interior streams in Iowa between 1902 and 1905, most of which were discontinued after a short period of operation. Daily-discharge records are continuous since 1903, however, for the stations Cedar River at Cedar Rapids (05464500) and Iowa River at Iowa City (05454500) (Burmeister, 1970, p. 3). Since that time, the Iowa USGS stream-gaging network has grown to include more than 100 gaging stations around the State. A chart of the number of Iowa gaging stations operated each year since the first stations were installed is shown in figure 2.

The Federal-State cooperative program for the collection of streamflow records in Iowa was established in 1914. The stream-gaging network increased from 18 stream-gaging stations in 1914 to 32 stations in 1922. The cooperative program was dissolved in 1928 and the number of stations decreased to 20. The cooperative program was resumed in 1932, and eight more stations were added to the stream-gaging network (Burmeister, 1970, p. 3).

Primarily because of the U.S. Army Corps of Engineers' flood-control program, the number of stream-gaging stations increased to 59 by 1939 (Burmeister, 1970, p. 3). The stream-gaging network declined by about 10 stations during World War II (1941 to 1945) and then increased steadily from 70 stations in 1945 to 129 stations in 1970. The size of the network has fluctuated annually since then with a minimum of 108 stations in 1984. There were 118 stream-gaging stations in 1996.

The gaging-station network is not a network in the purest sense. Data collected at one station or group of stations are intended to

answer different questions than data collected at other stations. Rather, the network is an amalgam of many individual networks with different purposes and sources of funding. Fortunately, many USGS stations provide data that are useful for purposes other than that for which the station was originally installed (Wahl and Crippen, 1984, p. 1). In 1995, the USGS conducted a survey of users of the USGS stream-gaging network in Iowa to determine more definitively who uses streamflow data and for what purposes the data are used. The survey responses showed that streamflow data collected at many stations in Iowa often are used by other agencies for purposes other than originally planned (Fischer, 1996).

EXPLANATION OF STATION SUMMARIES AND STREAMFLOW STATISTICS

The streamflow-gaging station summaries and statistics comprise nine elements, which are presented in the following order for each station:

- Station description.
- Station rating table.
- Statistics of monthly and annual mean discharges.
- Graph of annual mean discharge.
- Monthly and annual flow durations.
- Magnitude and frequency of instantaneous peak discharges.
- Magnitude and frequency of annual high discharges.
- Magnitude and frequency of annual low discharges.
- Magnitude and frequency of seasonal low discharges.

The elements are described below.

The station summaries and statistics are presented in downstream order. Streamflow-gaging stations are assigned unique, 8-digit numbers for identification. The first two digits are a part number and refer to major drainage basins. Part 5 refers to the Upper Mississippi River Basin and part 6 refers to the Missouri River Basin. The six remaining digits are assigned to the station on the basis of downstream order (numbers increase from headwaters to mouth).

Two sets of statistics are presented for stations located downstream of flow-regulation dams, the first for the pre-regulated streamflow period and the second for the regulated streamflow period. (See below, Data Considerations: Effects of Regulation and Water Use.)

Monthly and annual mean flows, flow-durations, flood-frequencies, and high-flow frequencies were computed for complete water years of streamflow data (water year—annual periods beginning October 1 and ending September 30, named for the year in which it ends). Annual low-flow frequencies were computed for the climatic year (annual periods beginning April 1 and ending March 31, generally named for the year in which most of the months occur); and seasonal low-flow frequencies were computed for complete 3-month periods of seasonal record.

The statistics in this report were calculated using computer programs written to operate on Data General Aviion[1] workstations. Specifically, the monthly and annual mean flow statistics and magnitudes and frequencies of annual high discharges, annual low discharges, and seasonal low discharges were calculated using programs adapted from the USGS' WATSTORE suite of computer programs (Price and Meeks, 1977; Meeks and Dempster, 1984) and SWSTAT (Lumb, A.M., Thomas, Jr., W.O., and Flynn, K.M., U.S. Geological Survey, written commun., 1994). Flood-frequencies were calculated using the USGS program PEAKFQ (Thomas, Jr., W.O., Lumb, A.M., Flynn, K.M., and Kirby, W.H., U.S. Geological Survey, written commun., 1997). Flow durations were calculated directly from the streamflow data rather than by

[1]Use of the brand name in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

counting occurrences of daily values within flow intervals, as was done in the previous streamflow statistics report (Fischer and others, 1990).

The streamflow daily values data used in the calculations were retrieved from the Iowa District's ADAPS computer database (Dempster, 1990).

Station Description

The location, drainage area, period of record, and other pertinent information about each stream-gaging station are presented in a format similar to that used in USGS annual water data reports (see, for example, May and others, 1996). The following comments briefly explain the various headings.

LOCATION.—Information on gage location is furnished with respect to cultural and physical features in the vicinity of the gage. In the case of discontinued stations, the location is furnished using features present at the time the gage was in operation. In many instances, the identifying features have changed since the stream-gaging station was discontinued. Public Land Survey System coordinates (township, range, section) are referenced to the fifth principal meridian unless noted otherwise. River mileage was determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968 (U.S. Water Resources Council, 1968), or was provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.—Drainage areas are measured using the most accurage maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas of discontinued stations were determined at the time the gage was in operation.

PERIOD OF RECORD.—The period of record is the period for which daily mean streamflow data are available for computation of the statistical summaries. Stream-gaging stations that are no longer active are noted as "(discontinued)."

GAGE.—Gage is the type of gage that was used to collect the data. Gage datum is referenced to sea level, which unless noted otherwise, is the National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.—Extremes for the period of record include the maximum instantaneous discharge and stage, the minimum discharge, and the dates of the respective extremes. Unless qualified otherwise, the maximum stage is that which corresponds to the maximum instantaneous discharge.

REMARKS.—Additional information about the stream-gaging station or factors that significantly affect streamflow at the site are provided here.

Several references are made in this report to WSP. WSP is the acronym for U.S. Geological Survey Water Supply Papers, which were the original medium for publishing streamflow data.

Station Rating Table

The rating tables presented in this report are composed of selected values from the most recent rating table developed for each station. The ratings can be used to relate approximately the stage of discharges given in the tables to the station's datum. Water-surface elevations above sea level can be determined by adding the rating-table gage height to the gage datum. Because the stage-discharge relation at most stations changes as the stream channel evolves, data users are advised to validate a rating table when it is necessary to determine up-to-date stage-discharge relations.

Statistics of Monthly and Annual Mean Discharges

The statistics of the monthly and annual mean discharges include the minimum, maximum, and mean values for each gaging-station. Both the monthly and annual mean discharges are computed using data only from complete water years. The water-year of occurrence of the minimum and maximum values and the standard deviation of the mean value are listed with the respective values. The standard deviation presented in this table is a measure of the variability of the respective mean

values. As such, it is smaller than the standard deviation that would be obtained if the daily values in the respective periods had been averaged directly.

Graph of Annual Mean Discharges

The annual mean discharges for the period of record are plotted on a graph. Also shown on the graph are lines depicting the mean of the annual mean discharges and the 50-percent annual flow duration.

Monthly and Annual Flow Duration

The monthly and annual flow duration table is a frequency analysis of the daily discharge values. The daily values are sorted by value and the percentiles computed. Because the flow durations are computed on daily values, the percentiles are the same as "percentage of days discharge equaled or exceeded." For example, if the 90-percent flow duration value for October is 300 ft^3/s, then 90 percent of the October daily discharge values in the period of record were greater than or equal to 300 ft^3/s. Flow durations are computed using only complete water years of record.

Magnitude and Frequency of Instantaneous Peak Discharges

The magnitudes and frequencies of instantaneous peak discharges, also called flood-frequency discharges, are computed using procedures recommended by the Interagency Advisory Committee on Water Data (1982). A flood-frequency curve is developed by fitting a Pearson Type-III distribution to the logarithms (base 10) of the station's annual peak discharges. In addition to the annual peak discharges measured during the period of systematic record collection (also called the "systematic record"), historic peak-flood information (called the "historical record") often is included in the analyses to effectively extend the length of the flood record. An effective record length therefore is computed and included in the table. If the flood-frequency curve is historically adjusted, the effective record length is greater than the systematic record length, otherwise it is equal to the systematic record length (Eash, 1993, p. 9).

Flood-frequency tabulations list the magnitudes of theoretical instantaneous peak flows for selected exceedance probabilities and corresponding recurrence intervals. Exceedance probability is the probability that the peak flow will equal or exceed the stated magnitude in any given year. Recurrence interval, which is the reciprocal of the exceedance probability, represents the expected average number of years between occurrences of annual peak flows greater than or equal to the stated magnitude.

Users requiring flood frequencies (and annual high-flow frequencies—see below) at stations downstream of U.S. Army Corps of Engineer dams in Iowa should contact the Corps of Engineers.

With regard to gaging stations on the Mississippi and Missouri Rivers, the Corps of Engineers, in partnership with State and Federal agencies, recently initiated a study to develop new flow frequencies for the main-stem Upper Mississippi, Lower Missouri, and Illinois Rivers. The Upper Mississippi is that portion of the river above the mouth of the Ohio River and includes the Illinois River. The Lower Missouri is that portion of the river below Gavins Point Dam in South Dakota. This study effort includes the participation of seven States–Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, and Wisconsin; and five other Federal agencies–Bureau of Reclamation, Federal Emergency Management Agency, Natural Resources Conservation Service, National Weather Service, and the USGS. The target completion date is September 2001.

Magnitudes and Frequencies of High and Low Discharges

The magnitudes and frequencies of annual high discharges, annual low discharges, and seasonal low discharges also are based on fitting the Pearson Type-III distribution to the logarithms of the respective discharges. Unlike flood-frequency analyses, however, no historical data are used. For annual high-flow discharges, the exceedance probability is the probability that the discharge will be greater than or equal to the stated magnitude in any given year. For annual and seasonal low-flow discharges, the non-

exceedance probability is the probability that the discharge will be less than or equal to the stated magnitude in any given year.

Magnitude and frequency computations, especially for low discharges, are prone to inconsistencies. For example, a 3-day low-flow value at the 0.01 non-exceedance probability might be computed to be less than the 1-day low-flow value computed for the same non-exceedance probability. When this situation occurred, the frequency curves were modified from the log-Pearson Type-III distribution. Magnitude and frequency values that could not be determined are indicated by a double-dash, "--".

DATA CONSIDERATIONS

Period of Record

The reliability of statistical streamflow data is related to the length of streamflow record. The Interagency Advisory Committee on Water Data (1982) recommends that at least 10 years of record be used for computing flood-frequency discharges. Therefore, the length-of-record criterion for including a stream-gaging station in this report was set at 10 years. Even with this criterion, statistical computations based on short periods of record, for example 10 to 15 years, still are less reliable than computations based on long periods of record, for example 50 or more years.

The lengths of streamflow records at gaging stations included in this report vary greatly. Extreme high or low flows that are part of the streamflow record of one station might not be part of the record of another, resulting in apparent inconsistencies in the streamflow statistics when comparing station data.

Data Rounding

The number of significant figures used to report discharges is based on the type of computation and on the magnitude of the discharge. Monthly and annual mean discharges are rounded according to the criteria listed in table 1; flow duration and probability discharges are rounded according to the criteria listed in table 2.

Table 1.--Significant figures used for reporting monthly and annual mean discharges

Range of discharge (cubic feet per second)	Significant figures
less than 0.010	1
0.010 to 0.099	2
0.10 to 0.99	2
1.00 to 9.99	3
10.0 to 99.9	3
100 to 999	3
greater than or equal to 1,000	4

Table 2.--Significant figures used for reporting flow duration and probability discharges

Range of discharge (cubic feet per second)	Significant figures
less than 0.010	1
0.10 to 0.99	2
1.0 to 9.9	2
10 to 99	2
greater than or equal to 100	3

Effects of Regulation and Water Use

Streamflows measured at several Iowa gaging stations are affected by reservoir regulation. Reservoir regulation has the effect of decreasing high flows and augmenting low flows downstream of the dam. Because regulation affects streamflow characteristics, two sets of statistics are computed for stations located downstream from reservoirs. The first set is computed for the period of record before reservoir operation began (pre-regulated streamflow period) and the second set is computed for the period after reservoir operation began (regulated streamflow period). Only one set of statistics is calculated for the Mississippi River stations, however, because the Mississippi River locks and dams were built for river navigation and have only a minimal regulatory effect on streamflows. Regarding Missouri River streamflow statistics included in this report, significant streamflow regulation is considered to have begun in water year 1953 when storage behind Fort Randall Dam, South Dakota, began in late 1952.

The streamflow statistics in this report are not adjusted for the effects of water use. The primary uses of surface-water in Iowa are thermoelectric power generation, self-supplied industrial use, and public-water supply (Solley and others, 1993, p. 15). Other surface-water uses include mining, livestock watering, self-supplied commercial, and irrigation. While some of this water is used consumptively, most of it is returned to the streams.

Availability of Streamflow Data

Historical and current USGS streamflow data for Iowa can be obtained from the World Wide Web. The World Wide Web address is

`http://iowa.usgs.gov/`

Peak flow data on which the instantaneous peak flow estimates are based also can be obtained through this address.

REFERENCES

Burmeister, I.L., 1970, The streamflow data program in Iowa: U.S. Geological Survey Open-File Report, 82 p.

Dempster, G.R., ed., 1990, Automated data processing system, vol. 2, chp. 3, *in* National water information system user's manual: U.S. Geological Survey Open-File Report 90-116.

Eash, D.A., 1993, Estimating design-flood discharges for streams in Iowa using drainage-basin and channel-geometry characteristics: U.S. Geological Survey Water-Resources Investigations Report 93-4062, 96 p.

Fischer, E.E., 1996, Survey of users of the USGS stream-gaging network in Iowa, 1996: U.S. Geological Survey Open-File Report 96-185, 35 p.

Fischer, E.E., Melcher, N.B., and Kluesner, S.P., 1990, Statistical summaries of selected Iowa streamflow data through September 30, 1988: U.S. Geological Survey Open-File Report 90-170, 641 p.

Interagency Advisory Committee on Water Data, 1982, Guidelines for determining flood flow frequency: Hydrology Subcommittee Bulletin 17B, U.S. Geological Survey, Office of Water Data Coordination, 28 p. and appendices.

Lew, Melvin, and Dodds, Betty, 1996, Operation of hydrologic data-collection stations by the U.S. Geological Survey in 1995: U.S. Geological Survey Open-File Report 96-132, 28 p.

May, J.E., Gorman, J.G., Goodrich, R.D., Bobier, M.W., and Miller, V.E., 1996, Water resources data, Iowa, water year 1995: U.S. Geological Survey Water-Data Report IA-95-1, 390 p.

Meeks, W.C., and Dempster, G.R., 1984 (revision date), Daily values statistics (programs A969 and A193), *in* WATSTORE user's guide, vol. 1, chp. IV, sec. G: U.S. Geological Survey Open-File Report 75-426, 39 p. (sec. G).

Price, W.E. Jr., and Meeks, W.C., 1977, Daily values monthly and annual statistics (program W4422), *in* WATSTORE user's guide, vol. 1, chp. IV, sec. F: U.S. Geological Survey Open-File Report 75-426, 46 p. (sec. F).

Solley, W.B., Pierce, R.R., and Perlman, H.A., 1993, Estimated use of water in the United States in 1990: U.S. Geological Survey Circular 1081, 76 p.

U.S. Water Resources Council, 1968, River mileage measurement: Hydrology Committee, Bulletin 14, revision of October 1968, 17 p.

Wahl, K.L., and Crippen, J.R., 1984, A pragmatic approach to evaluating a multipurpose stream-gaging network: U.S. Geological Survey Water-Resources Investigations Report 84-4228, 13p.

STREAMFLOW STATISTICS

05387500 UPPER IOWA RIVER AT DECORAH, IOWA

LOCATION.—Lat 43°18'19", long 91°47'48", in NE1/4 SW1/4 sec. 16, T98N, R8W, Winneshiek County, Hydrologic Unit 07060002, on right bank 1,200 ft upstream from bridge on U.S. Highway 52 (city route) in Decorah, 1,500 ft downstream from Dry Run cutoff and 3.0 mi upstream from Trout Run.

DRAINAGE AREA.—511 mi^2.

PERIOD OF RECORD.—October 1951 to October 1983 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 850.00 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,200 ft^3/s, March 27, 1961, gage height, 13.08 ft; minimum daily discharge, 22 ft^3/s, February 2-7, 1959.

Selected values from rating table number 10, developed March 1972
(A discharge measurement to validate this rating has not been made since November 1983.)

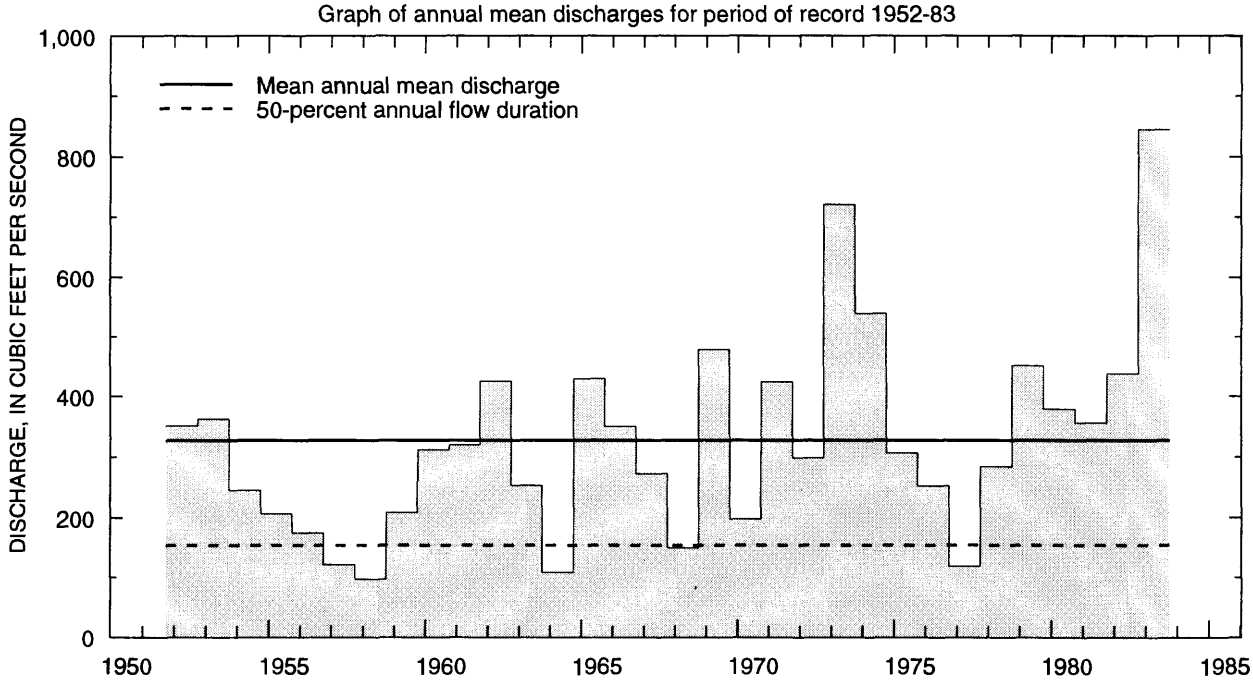
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	27	6.0	1,470
3.7	61	7.0	2,620
4.0	141	8.0	4,000
4.5	345	9.0	5,530
5.0	625	10.0	7,400
5.5	990		

05387500 UPPER IOWA RIVER AT DECORAH, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1952-83

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	896	1973	37.2	1959	239	225
November	1,111	1983	43.2	1965	218	238
December	940	1983	40.2	1959	162	170
January	662	1973	25.7	1959	134	130
February	789	1966	25.3	1959	163	156
March	1,937	1961	72.6	1968	699	453
April	2,067	1965	89.6	1957	635	457
May	1,453	1973	81.6	1958	415	316
June	1,652	1969	64.5	1958	431	388
July	1,028	1969	53.0	1958	307	251
August	1,353	1953	44.8	1958	246	252
September	1,305	1965	39.6	1958	273	305
Annual	845	1983	96.7	1958	327	167

Graph of annual mean discharges for period of record 1952-83



05387500 UPPER IOWA RIVER AT DECORAH, IOWA—Continued

Monthly and annual flow durations, based on period of record 1952-83

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	36	39	35	24	24	35	63	60	57	48	39	38	35
95	44	46	44	34	41	58	94	86	72	62	52	53	50
90	58	58	48	46	50	68	128	110	100	81	63	62	61
85	66	64	54	54	56	76	153	141	119	94	75	67	70
80	72	72	62	57	59	85	189	168	133	106	84	72	78
75	78	79	70	61	65	97	219	185	148	119	92	78	88
70	84	88	80	68	70	111	253	200	166	131	99	87	97
60	105	115	97	76	78	151	323	238	195	158	115	100	123
50	132	133	110	88	87	260	399	276	227	189	134	132	154
40	161	170	125	98	105	368	487	330	270	229	170	159	200
30	230	207	148	117	122	570	617	398	333	277	206	194	264
25	274	233	170	133	138	697	713	441	380	314	226	233	312
20	336	260	190	150	154	905	818	523	426	364	262	282	372
15	415	328	230	170	206	1,370	1,050	648	505	444	311	349	471
10	543	432	268	220	272	1,870	1,300	867	654	560	390	484	645
5	767	610	384	347	450	2,840	1,970	1,280	1,120	924	663	704	1,100

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 69 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,190
0.90	1.11	2,860
0.80	1.25	3,890
0.50	2	6,650
0.20	5	10,700
0.10	10	13,400
0.04	25	16,700
0.02	50	19,000
0.01	100	21,300
0.005	200	23,500

[a] Analysis includes area-weighted peak discharges (1914, 1919-27, 1933-40 1942-51) computed from station 05388000 Upper Iowa River near Decorah.

Magnitude and frequency of annual high discharges, based on period of record 1952-83

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	562	411	268	181
0.95	1.05	1,030	718	477	326
0.90	1.11	1,390	952	636	436
0.80	1.25	1,960	1,320	882	606
0.50	2	3,610	2,350	1,550	1,060
0.20	5	6,230	3,960	2,550	1,700
0.10	10	8,070	5,090	3,210	2,110
0.04	25	10,400	6,540	4,020	2,590
0.02	50	12,200	7,620	4,600	2,930
0.01	100	13,900	8,700	5,160	3,240
0.005	200	15,700	9,780	5,700	3,530

05387500 UPPER IOWA RIVER AT DECORAH, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1952 to March 1983

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	20	20	21	22	25	28	30	31	32
0.02	50	23	23	24	25	28	32	34	35	36
0.05	20	27	28	29	31	34	38	41	43	45
0.10	10	32	33	34	36	40	44	48	52	55
0.20	5	39	40	42	44	49	54	60	65	72
0.50	2	55	57	61	64	71	80	91	101	123
0.80	1.25	77	80	85	90	100	120	141	162	221
0.90	1.11	91	94	101	108	119	150	179	209	304
0.96	1.04	109	112	120	129	142	191	233	276	435
0.98	1.02	121	125	133	144	159	224	277	333	551
0.99	1.01	134	137	146	159	175	259	324	394	686

Magnitude and frequency of seasonal low discharges, based on period of record October 1951 to September 1983

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	20	21	23	31	35	38	39	53
0.02	50	23	24	26	33	41	45	46	62
0.05	20	28	29	31	38	52	57	59	79
0.10	10	33	35	37	44	64	70	74	97
0.20	5	41	43	46	52	83	91	98	125
0.50	2	60	65	70	77	135	148	165	204
0.80	1.25	91	101	108	124	220	242	275	335
0.90	1.11	113	127	137	165	285	313	358	435
0.96	1.04	143	162	177	228	375	411	475	576
0.98	1.02	167	191	210	285	448	491	568	691
0.99	1.01	191	222	245	353	527	576	668	814
		July-August-September				October-November-December			
0.01	100	28	31	31	34	23	26	28	32
0.02	50	33	35	36	39	26	29	32	36
0.05	20	40	42	44	48	31	36	39	42
0.10	10	47	51	53	58	38	43	46	50
0.20	5	59	62	66	73	48	55	58	63
0.50	2	88	93	101	113	77	88	94	102
0.80	1.25	131	139	153	175	129	145	158	182
0.90	1.11	161	170	191	220	171	192	213	256
0.96	1.04	200	212	241	281	235	260	296	380
0.98	1.02	230	244	281	328	290	318	371	498
0.99	1.01	260	277	322	378	351	384	456	642

05388000 UPPER IOWA RIVER NEAR DECORAH, IOWA

LOCATION.—Lat 43°18'20", long 91°44'50", IN SE1/4 NE1/4 sec. 14, T98N, R8W, Winneshiek County, Hydrologic Unit 07060002, on left bank 500 ft upstream from county highway bridge in Freeport, 1.4 mi downstream from Trout Run and 3 mi downstream from Decorah.

DRAINAGE AREA.—568 mi^2.

PERIOD OF RECORD.—August 1913 to November 1914 (no winter records), June 1919 to September 1927, July 1933 to September 1951 (discontinued).

GAGE.—Water-stage recorder at site since Oct. 28, 1936. Datum of gage is 829.8 ft above sea level (Winneshiek County benchmark). Aug. 27, 1913 to Nov. 21, 1914 and May 12, 1919 to Aug. 27, 1920 chain gage at same site at datum 3.96 ft lower. Aug. 28, 1920 to June 30, 1927 water-stage recorder at present site and datum. July 1, 1933 to Sept. 30, 1936 staff gage 4 mi downstream at different datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 28,500 ft^3/s, May 29, 1941, gage height, 15.19 ft (from floodmarks), from rating curve extended above 12,000 ft^3/s on basis of slope-area determination of peak flow; minimum daily discharge, 10 ft^3/s, many days during 1933-1934.

Selected values from rating table
developed October 1950
(A discharge measurement to validate this rating
has not been made since August 1952.)

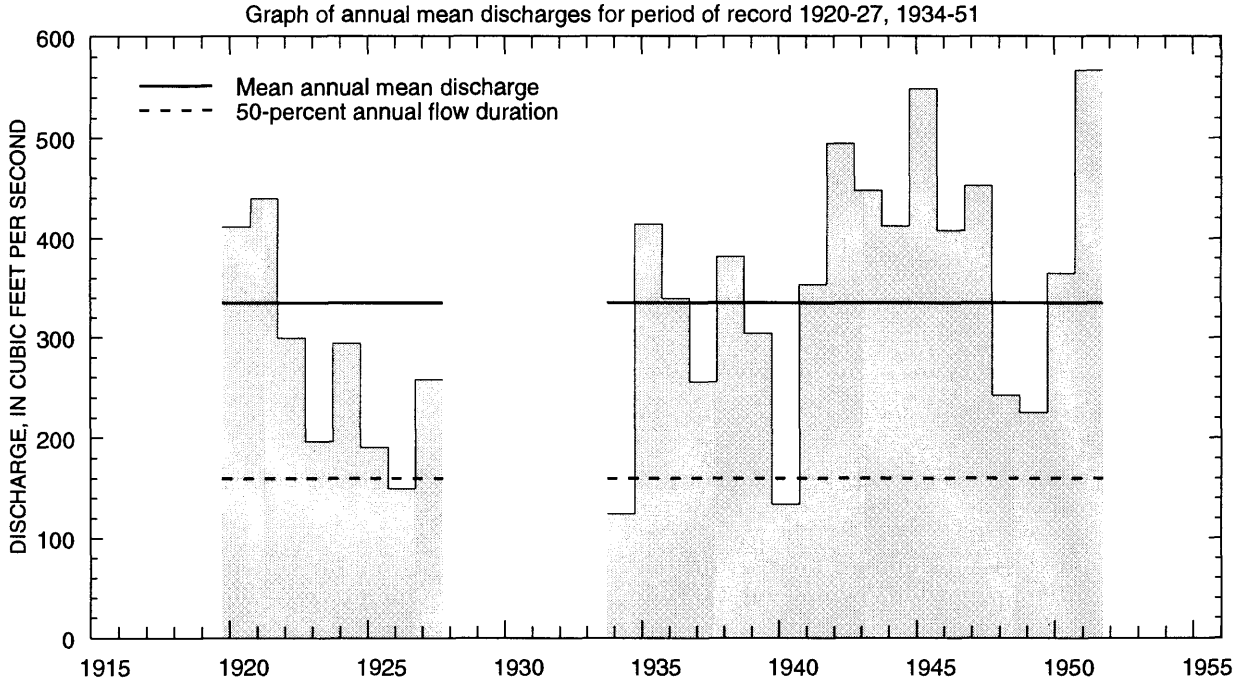
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
0.4	27.0	3.0	1,190
0.8	87.0	5.0	2,890
1.0	140	7.0	4,800
1.5	325	9.0	7,600
2.0	565	11.0	12,600
2.5	850	13.0	19,600

05388000 UPPER IOWA RIVER NEAR DECORAH, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1920-27, 1934-51

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	637	1943	51.0	1934	160	123
November	459	1939	40.8	1934	171	120
December	238	1921	36.3	1934	119	61.8
January	868	1946	50.0	1926	160	164
February	750	1948	48.5	1940	237	186
March	2,237	1936	54.7	1934	897	564
April	2,744	1951	148	1925	557	511
May	1,704	1921	43.2	1934	428	356
June	1,182	1947	29.6	1934	450	339
July	1,012	1950	83.0	1936	286	233
August	1,011	1942	53.6	1934	306	305
September	964	1938	63.1	1937	242	235
Annual	567	1951	124	1934	335	124

Graph of annual mean discharges for period of record 1920-27, 1934-51



05388000 UPPER IOWA RIVER NEAR DECORAH, IOWA—Continued

Monthly and annual flow durations, based on period of record 1920-27, 1934-51

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	30	30	25	39	29	39	86	37	16	27	30	37	32
95	54	52	47	44	47	79	116	73	60	64	56	62	50
90	64	64	50	50	50	120	151	93	85	75	66	66	64
85	71	68	58	50	59	141	185	125	108	80	73	71	72
80	76	73	61	56	62	175	212	146	120	84	80	77	80
75	81	77	68	63	68	202	229	158	133	90	82	83	86
70	86	86	70	66	74	230	245	172	144	99	87	88	98
60	96	103	82	78	100	309	288	219	187	132	110	108	125
50	114	120	97	87	120	426	340	265	260	172	142	136	160
40	137	143	111	104	142	585	402	330	334	230	181	170	207
30	164	184	137	130	176	815	485	403	428	292	229	206	272
25	183	213	162	144	203	961	556	439	499	321	277	238	317
20	202	254	193	170	239	1,230	630	501	594	381	341	283	382
15	232	292	216	190	317	1,670	780	620	722	467	439	320	480
10	285	340	223	223	486	2,250	1,040	830	950	567	651	434	662
5	383	416	241	368	800	3,220	1,900	1,210	1,420	904	1,130	706	1,110

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 69 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,340
0.90	1.11	3,060
0.80	1.25	4,160
0.50	2	7,100
0.20	5	11,300
0.10	10	14,100
0.04	25	17,600
0.02	50	20,000
0.01	100	22,300
0.005	200	24,600

[a] Analysis includes area-weighted peak discharges (1953-89) computed from station 05387500 Upper Iowa River at Decorah.

Magnitude and frequency of annual high discharges, based on period of record 1920-27, 1934-51

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,580	1,060	661	368
0.95	1.05	2,080	1,370	871	542
0.90	1.11	2,420	1,580	1,010	658
0.80	1.25	2,910	1,870	1,220	825
0.50	2	4,180	2,630	1,740	1,230
0.20	5	6,040	3,740	2,500	1,760
0.10	10	7,350	4,520	3,030	2,080
0.04	25	9,100	5,540	3,740	2,470
0.02	50	10,500	6,340	4,280	2,740
0.01	100	11,900	7,160	4,850	3,000
0.005	200	13,300	8,010	5,430	3,240

05388000 UPPER IOWA RIVER NEAR DECORAH, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1920 to March 1927, April 1934 to March 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	10	11	15	24	27	32	38	42	42
0.02	50	13	14	18	26	30	34	41	46	47
0.05	20	19	20	24	31	35	39	47	52	55
0.10	10	25	27	30	36	40	45	53	59	64
0.20	5	34	36	39	43	48	53	62	69	78
0.50	2	57	59	61	62	69	78	89	98	123
0.80	1.25	84	86	89	92	104	122	135	150	208
0.90	1.11	99	102	106	113	130	158	172	192	284
0.96	1.04	115	118	125	142	168	214	229	254	405
0.98	1.02	124	128	138	165	199	264	278	309	517
0.99	1.01	132	137	150	190	233	321	334	372	651

Magnitude and frequency of seasonal low discharges, based on period of record October 1919 to September 1927, July 1933 to September 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	9.8	24	28	31	10	19	23	25
0.02	50	13	27	30	35	16	27	31	34
0.05	20	20	32	35	40	30	42	47	53
0.10	10	27	38	41	47	48	60	67	76
0.20	5	39	46	49	58	78	89	97	112
0.50	2	68	68	73	89	153	163	177	215
0.80	1.25	103	105	113	148	227	252	281	358
0.90	1.11	122	134	144	198	255	298	340	445
0.96	1.04	141	174	191	277	275	344	402	542
0.98	1.02	152	208	231	348	284	369	441	605
0.99	1.01	162	245	276	432	289	390	473	660
		July-August-September				October-November-December			
0.01	100	8.9	23	33	39	12	23	30	31
0.02	50	12	27	36	43	15	27	34	35
0.05	20	19	34	43	51	22	33	39	43
0.10	10	28	42	50	59	30	39	46	51
0.20	5	42	55	61	72	42	49	55	63
0.50	2	81	89	93	112	72	76	81	95
0.80	1.25	136	141	151	188	113	118	124	147
0.90	1.11	169	180	200	255	137	148	156	185
0.96	1.04	207	231	276	362	163	190	203	238
0.98	1.02	231	271	343	459	180	223	242	280
0.99	1.01	252	312	420	575	195	257	284	325

05388250 UPPER IOWA RIVER NEAR DORCHESTER, IOWA

LOCATION.—Lat 43°25'16", long 91°30'31", in SW1/4 NW1/4 sec.1, T99N, R6W, Allamakee County, Hydrologic Unit 07060002, on right bank at upstream side of bridge on State Highway 76, 650 ft upstream from Mineral Creek, 0.5 mi upstream from Bear Creek, 3.5 mi south of Dorchester and 18.1 mi upstream from mouth.

DRAINAGE AREA.—770 mi^2.

PERIOD OF RECORD.—September 1936 to September 1938, October 1939 to June 1975 (discharge measurements only); October 1938 to September 1939, July 1975 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 660.00 ft NGVD of 1929. Prior to Jan. 6, 1938, nonrecording gage on old bridge at site 0.2 mi upstream at datum 5.91 ft higher. Jan. 6, 1938 to Apr. 26, 1948, nonrecording gage at datum 60.00 ft lower, Apr. 27, 1948 to August 1963, nonrecording gage on old bridge and August 1963 to June 1975 nonrecording gage on new bridge at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 22,000 ft^3/s, August 17, 1993, gage height, 20.00 ft; minimum daily discharge, 30 ft^3/s, September 23, 1939.

Selected values from rating table number 4, developed October 1978

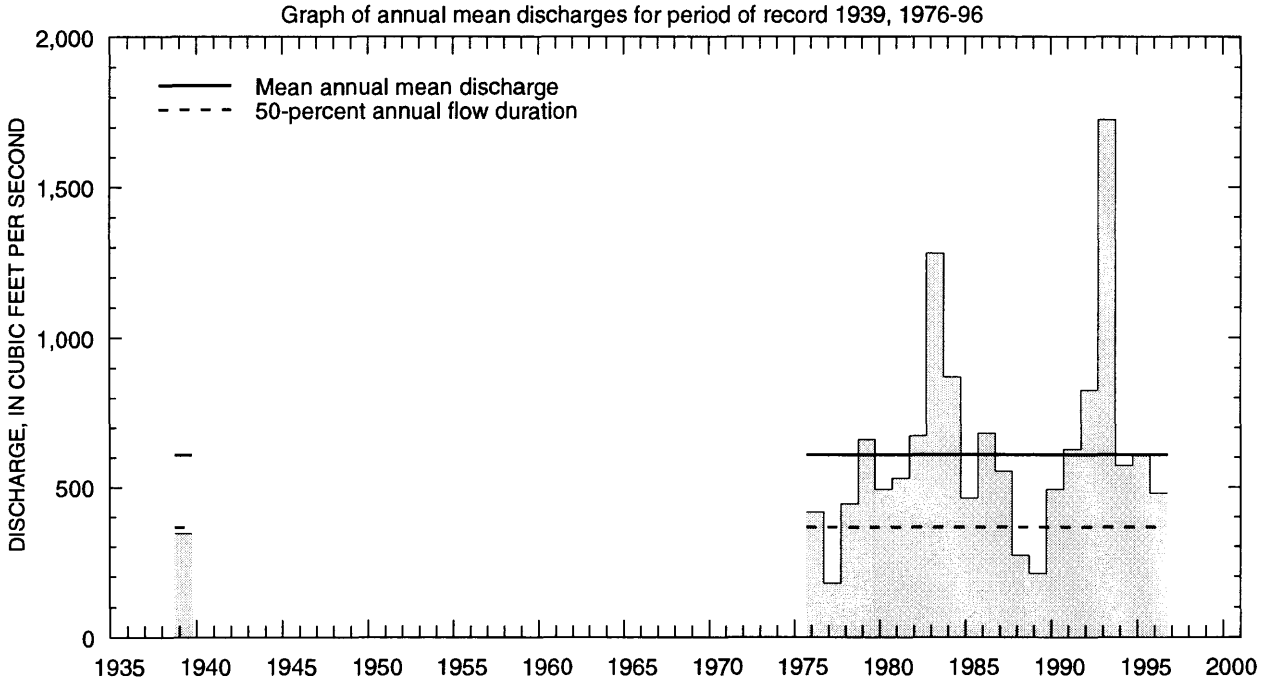
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.7	74	12.0	4,050
7.0	146	14.0	6,850
7.5	320	16.0	10,600
8.0	550	18.0	15,600
9.0	1,230	20.0	22,000
10.0	2,020	21.8	30,500

05388250 UPPER IOWA RIVER NEAR DORCHESTER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1939, 1976-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,045	1987	116	1990	434	419
November	1,476	1983	125	1990	459	365
December	1,421	1983	99.9	1990	383	351
January	836	1983	96.7	1977	280	185
February	1,400	1984	112	1978	397	315
March	1,922	1983	386	1981	1,061	445
April	3,973	1993	225	1977	1,031	806
May	2,066	1991	175	1977	806	555
June	2,765	1993	123	1977	756	613
July	3,318	1993	92.9	1939	625	702
August	3,702	1993	112	1989	583	761
September	1,334	1986	77.5	1939	476	368
Annual	1,726	1993	178	1977	609	345

Graph of annual mean discharges for period of record 1939, 1976-96



05388250 UPPER IOWA RIVER NEAR DORCHESTER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1939, 1976-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	110	106	85	92	91	93	170	148	102	68	60	59	90
95	123	125	105	109	100	171	217	189	128	110	102	111	116
90	133	136	115	121	120	210	262	244	156	132	116	127	135
85	161	147	125	130	132	246	341	296	216	174	136	143	160
80	178	172	150	137	148	289	425	335	252	203	166	168	185
75	192	195	170	146	160	334	470	370	310	233	196	205	210
70	210	213	190	155	178	387	521	390	345	288	263	222	240
60	252	277	220	175	215	523	619	469	423	357	296	256	296
50	300	332	262	200	240	640	765	592	500	392	330	316	365
40	349	383	294	240	280	865	895	763	600	445	391	404	446
30	404	472	346	285	320	1,140	1,090	925	747	528	488	464	574
25	507	536	394	316	370	1,300	1,240	1,030	856	588	541	504	667
20	584	611	450	380	412	1,540	1,450	1,220	1,020	698	592	569	802
15	683	696	619	455	498	1,800	1,680	1,450	1,260	863	683	720	996
10	797	894	857	540	659	2,390	1,970	1,720	1,540	1,210	1,020	966	1,330
5	1,160	1,280	1,100	624	1,610	3,380	2,640	2,120	2,100	2,400	1,950	1,350	1,950

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 48 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,480
0.95	1.05	3,450
0.90	1.11	4,120
0.80	1.25	5,130
0.50	2	7,820
0.20	5	12,000
0.10	10	15,100
0.04	25	19,300
0.02	50	22,600
0.01	100	26,100
0.005	200	29,800

[a] Analysis includes record-extension peak discharges (1952-75) computed from station 05387500 Upper Iowa River near Decorah.

Magnitude and frequency of annual high discharges, based on period of record 1939, 1976-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,170	794	681	502
0.95	1.05	1,670	1,180	952	702
0.90	1.11	2,020	1,440	1,130	837
0.80	1.25	2,530	1,820	1,390	1,030
0.50	2	3,850	2,780	2,040	1,530
0.20	5	5,820	4,100	2,930	2,240
0.10	10	7,200	4,960	3,520	2,720
0.04	25	9,010	6,010	4,260	3,330
0.02	50	10,400	6,770	4,810	3,790
0.01	100	11,800	7,510	5,350	4,250
0.005	200	13,300	8,240	5,890	4,720

05388250 UPPER IOWA RIVER NEAR DORCHESTER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1976 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	58	63	63	67	72	74	80	82	85
0.02	50	62	68	69	73	79	83	89	91	92
0.05	20	70	77	79	85	92	98	105	110	113
0.10	10	78	86	90	97	105	115	123	131	140
0.20	5	91	100	106	114	125	139	149	162	183
0.50	2	128	138	149	160	177	203	221	246	304
0.80	1.25	192	200	216	230	257	301	340	378	506
0.90	1.11	243	249	266	281	315	371	433	477	661
0.96	1.04	318	320	337	351	395	466	566	611	878
0.98	1.02	384	390	394	407	459	541	678	720	1,060
0.99	1.01	445	445	456	467	527	619	800	835	1,250

Magnitude and frequency of seasonal low discharges, based on period of record October 1938 to September 1939, July 1975 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	54	71	74	80	46	73	76	89
0.02	50	59	76	80	87	60	88	92	106
0.05	20	68	86	92	101	88	116	122	139
0.10	10	78	97	104	115	121	147	157	177
0.20	5	93	114	123	136	174	198	211	238
0.50	2	135	160	174	195	325	343	371	422
0.80	1.25	207	237	260	291	563	590	642	756
0.90	1.11	264	296	328	366	727	779	852	1,030
0.96	1.04	347	383	426	474	933	1,050	1,150	1,430
0.98	1.02	419	457	509	565	1,080	1,260	1,390	1,780
0.99	1.01	498	539	601	664	1,230	1,490	1,640	2,170
		July-August-September				October-November-December			
0.01	100	31	49	61	68	58	64	72	81
0.02	50	41	59	71	78	66	73	81	90
0.05	20	61	77	88	97	80	89	98	106
0.10	10	83	98	108	119	95	107	116	124
0.20	5	119	129	139	153	116	132	142	152
0.50	2	217	218	228	255	174	198	211	232
0.80	1.25	352	362	380	443	261	293	315	373
0.90	1.11	436	469	501	603	324	359	389	489
0.96	1.04	531	613	676	848	409	443	490	664
0.98	1.02	595	727	823	1,060	475	508	568	816
0.99	1.01	653	846	985	1,310	545	573	651	989

05388500 PAINT CREEK AT WATERVILLE, IOWA

LOCATION.—Lat 43°12'37", long 91°18'21", in NW1/4 NW1/4 sec. 22, T97N, R4W, Allamakee County, Hydrologic Unit 07060001, on right bank 100 ft downstream from bridge on County Highway X32, 0.5 mi northwest of Waterville and 10 mi upstream from mouth.

DRAINAGE AREA.—42.8 mi^2.

PERIOD OF RECORD.—October 1952 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 840 ft above sea level (from topographic maps).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 5,010 ft^3/s, July 29, 1970, gage height,10.31 ft; minimum daily discharge, 1.1 ft^3/s, several days in August and September, 1958.

Selected values from rating table number 8, developed March 1968
(A discharge measurement to validate this rating has not been made since October 1973.)

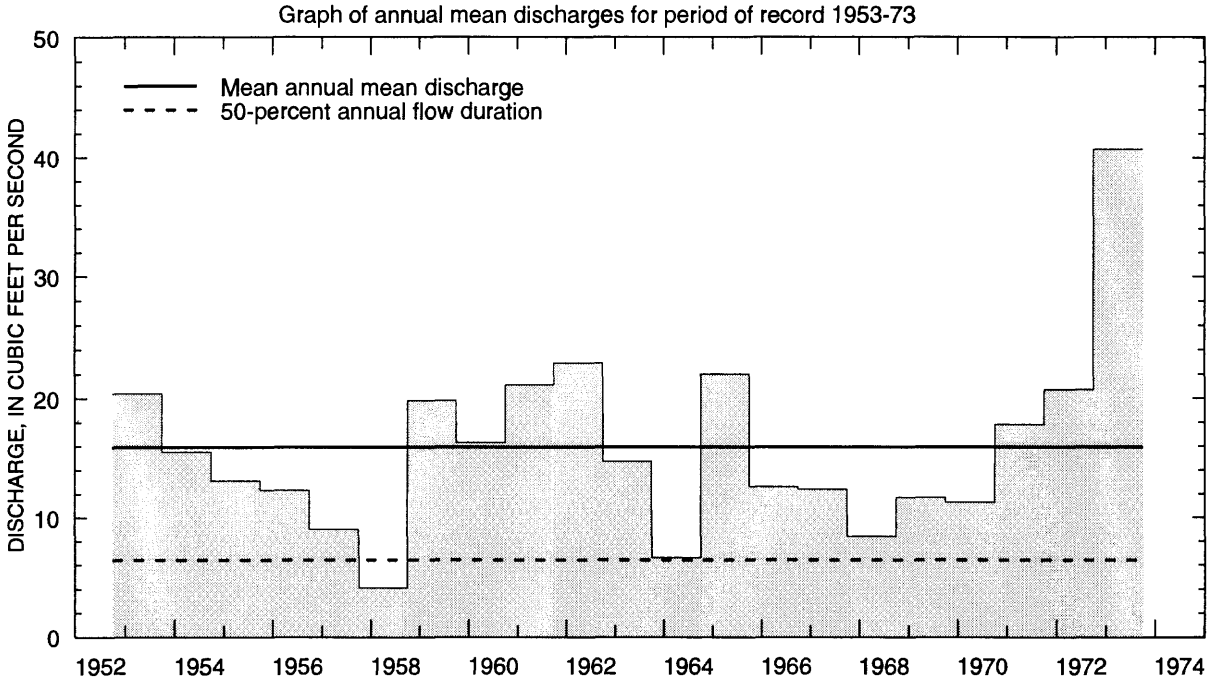
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	7.5	6.0	1,020
3.5	35	7.0	1,600
4.0	109	8.0	2,650
4.5	250	9.0	3,800
5.0	510	10.0	4,750
5.5	800		

05388500 PAINT CREEK AT WATERVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-73

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	25.1	1973	1.86	1959	7.81	5.69
November	22.5	1973	1.82	1968	7.88	5.68
December	46.5	1973	1.77	1959	8.05	9.46
January	39.3	1973	1.30	1959	9.20	9.31
February	65.3	1966	1.50	1959	14.0	16.3
March	136	1961	3.80	1964	50.6	41.1
April	88.0	1965	4.05	1958	23.1	22.6
May	87.3	1973	2.46	1958	17.9	18.1
June	40.8	1973	2.45	1958	15.7	11.0
July	45.0	1970	2.12	1958	15.9	12.0
August	34.1	1953	1.65	1958	9.44	8.37
September	31.1	1965	1.70	1958	10.7	8.48
Annual	40.7	1973	4.10	1958	15.9	7.76

Graph of annual mean discharges for period of record 1953-73



05388500 PAINT CREEK AT WATERVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.6	1.5	1.5	1.2	1.5	1.4	1.8	1.9	1.9	1.7	1.3	1.3	1.5
95	1.8	1.8	1.7	1.5	1.5	1.7	2.7	2.4	2.3	2.0	1.8	1.7	1.8
90	2.4	2.2	1.8	1.9	2.2	2.5	3.6	2.9	3.1	2.6	2.3	2.1	2.3
85	2.6	2.4	2.1	2.3	2.4	3.5	4.2	3.2	3.6	2.9	2.8	2.9	2.8
80	3.0	2.9	2.7	2.6	2.5	3.8	5.1	3.8	3.8	3.1	3.0	3.1	3.2
75	3.2	3.2	3.0	2.7	3.0	4.5	5.9	5.0	4.2	3.6	3.4	3.6	3.6
70	3.6	3.6	3.2	3.1	3.3	5.0	6.5	5.7	4.6	4.3	3.8	4.0	4.0
60	4.7	5.2	4.6	4.2	4.0	6.4	7.6	6.8	6.0	5.4	5.0	5.4	5.3
50	5.9	5.9	5.4	4.9	5.0	7.8	9.0	8.6	7.7	6.6	5.9	6.1	6.4
40	7.2	7.7	6.8	5.8	5.6	10	12	11	11	10	7.1	7.2	7.8
30	8.9	9.2	8.0	6.6	6.4	19	17	14	14	12	8.3	8.4	9.6
25	9.7	9.8	8.6	6.8	7.4	27	20	16	15	14	8.9	9.8	11
20	11	12	9.3	7.4	8.6	36	24	18	17	15	9.5	12	13
15	12	14	9.8	8.0	12	60	27	22	20	18	12	14	17
10	14	18	12	8.7	16	108	38	33	30	23	21	17	22
5	17	20	15	15	30	295	74	60	46	32	25	23	38

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 21 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	870
0.90	1.11	1,080
0.80	1.25	1,390
0.50	2	2,240
0.20	5	3,550
0.10	10	4,490
0.04	25	5,750
0.02	50	6,720
0.01	100	7,730
0.005	200	8,760

Magnitude and frequency of annual high discharges, based on period of record 1953-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	71	45	24	14
0.95	1.05	114	66	36	22
0.90	1.11	145	81	46	29
0.80	1.25	194	105	60	38
0.50	2	328	174	102	64
0.20	5	538	294	174	105
0.10	10	688	390	230	133
0.04	25	886	529	309	171
0.02	50	1,040	646	373	199
0.01	100	1,190	775	443	228
0.005	200	1,350	917	519	258

05388500 PAINT CREEK AT WATERVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.75	0.78	0.91	0.95	1.0	1.0	1.0	1.0	1.1
0.02	50	0.88	0.90	1.0	1.1	1.2	1.2	1.3	1.3	1.4
0.05	20	1.1	1.1	1.3	1.3	1.4	1.6	1.7	1.7	1.9
0.10	10	1.3	1.4	1.5	1.6	1.8	2.0	2.1	2.2	2.5
0.20	5	1.7	1.7	1.9	2.0	2.2	2.5	2.8	3.0	3.4
0.50	2	2.7	2.7	2.9	3.1	3.4	4.0	4.5	5.0	5.9
0.80	1.25	4.1	4.2	4.4	4.7	5.1	6.1	7.0	7.9	9.5
0.90	1.11	5.2	5.3	5.5	5.8	6.3	7.5	8.6	9.8	12
0.96	1.04	6.6	6.7	7.0	7.3	8.0	9.2	11	12	15
0.98	1.02	7.6	7.8	8.1	8.4	9.2	10	12	14	17
0.99	1.01	8.8	9.0	9.3	9.6	10	12	13	16	19

Magnitude and frequency of seasonal low discharges, based on period of record October 1952 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.95	0.96	0.96	1.3	1.0	1.1	1.3	1.7
0.02	50	1.1	1.1	1.1	1.4	1.2	1.3	1.5	1.9
0.05	20	1.4	1.4	1.4	1.7	1.5	1.7	1.9	2.3
0.10	10	1.7	1.8	1.8	2.0	1.9	2.1	2.3	2.8
0.20	5	2.2	2.3	2.3	2.5	2.5	2.7	3.0	3.7
0.50	2	3.5	3.7	3.8	4.1	4.4	4.8	5.3	6.6
0.80	1.25	5.7	5.9	6.2	7.0	8.3	9.0	10	13
0.90	1.11	7.3	7.6	8.0	9.5	12	13	14	19
0.96	1.04	9.6	10	11	13	17	19	22	30
0.98	1.02	11	12	13	17	22	25	29	41
0.99	1.01	14	14	15	21	29	32	37	55
		July-August-September				October-November-December			
0.01	100	0.74	0.92	1.0	1.2	0.91	0.93	0.95	0.98
0.02	50	0.88	1.1	1.2	1.4	1.1	1.1	1.1	1.2
0.05	20	1.1	1.4	1.5	1.7	1.4	1.5	1.5	1.6
0.10	10	1.5	1.7	1.8	2.2	1.8	1.9	1.9	2.0
0.20	5	2.0	2.2	2.4	2.9	2.3	2.5	2.6	2.7
0.50	2	3.6	3.9	4.3	5.0	3.9	4.1	4.3	4.8
0.80	1.25	7.0	7.3	7.8	8.9	6.2	6.7	7.2	8.3
0.90	1.11	9.9	10	11	12	7.8	8.7	9.3	11
0.96	1.04	15	15	16	17	9.9	11	12	14
0.98	1.02	19	20	20	21	11	13	14	17
0.99	1.01	24	25	25	26	13	15	17	20

05389000 YELLOW RIVER AT ION, IOWA

LOCATION.—Lat 43°06'35", long 91°15'45", in SE1/4 SW1/4 sec. 24, T96N, R4W, Allamakee County, Hydrologic Unit 07060001, on downstream side of county highway bridge at Ion, 7.5 mi northwest of McGregor and 8 mi upstream from mouth.

DRAINAGE AREA.—221 mi^2.

PERIOD OF RECORD.—October 1934 to September 1951 (discontinued).

GAGE.—Wire-weight gage and crest-stage gage; gage read once daily, more often at high stages. Datum of gage is 664.65 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 18,500 ft^3/s, May 29, 1941, gage height, 15.2 ft (from floodmarks), from rating curve extended above 7,300 ft^3/s on basis of slope-area determination of peak flow; minimum daily discharge, 14 ft^3/s, December 30 and 31, 1939.

Selected values from rating table
developed October 1949
(A discharge measurement to validate this rating
has not been made since December 1951.)

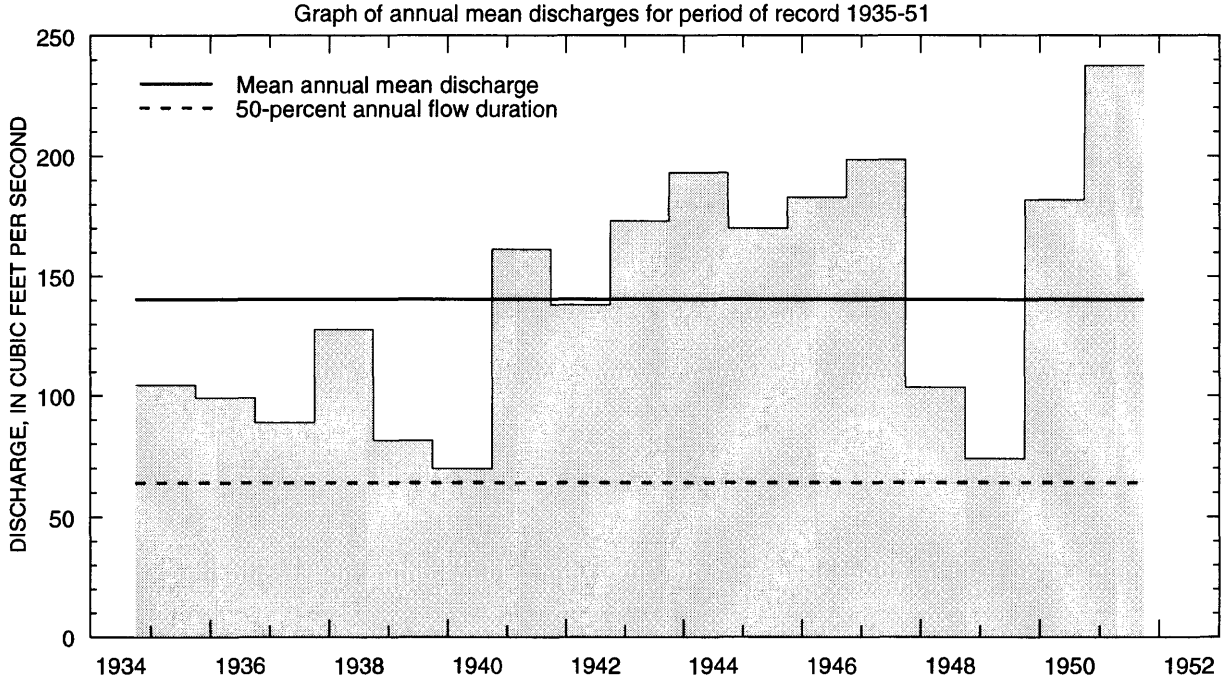
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.7	25	5.0	1,380
2.0	64	6.0	2,340
2.5	153	8.0	4,900
3.0	285	10.0	8,550
3.5	470	12.0	13,300
4.0	715		

05389000 YELLOW RIVER AT ION, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1935-51

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	148	1943	25.6	1938	60.3	35.7
November	132	1943	21.1	1938	63.4	35.5
December	89.4	1943	19.9	1938	47.9	18.4
January	390	1946	23.1	1940	71.9	85.3
February	344	1938	21.4	1940	125	92.3
March	894	1950	123	1938	381	185
April	757	1951	75.6	1940	180	177
May	432	1941	29.6	1940	137	102
June	692	1944	25.1	1940	229	208
July	325	1951	29.7	1936	135	97.0
August	396	1943	24.8	1937	148	115
September	349	1938	24.8	1937	105	95.8
Annual	238	1951	69.8	1940	140	51.0

Graph of annual mean discharges for period of record 1935-51



05389000 YELLOW RIVER AT ION, IOWA—Continued

Monthly and annual flow durations, based on period of record 1935-51

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	23	18	17	18	19	22	33	28	21	21	22	22	20
95	23	22	20	21	22	40	52	31	28	26	24	24	24
90	25	26	23	24	23	56	58	50	37	30	29	27	27
85	27	27	25	26	25	67	64	54	42	33	32	34	31
80	30	28	27	28	29	80	69	56	47	39	43	37	35
75	34	33	29	30	31	94	74	59	50	48	49	39	40
70	36	36	32	31	33	109	79	62	55	53	51	41	45
60	40	40	37	35	39	136	89	72	70	60	57	51	55
50	50	51	43	41	45	166	100	88	84	73	65	62	64
40	57	60	49	48	50	208	116	104	112	97	84	74	78
30	64	72	55	58	64	264	153	124	179	129	101	86	100
25	70	82	60	63	70	323	182	140	215	142	115	103	115
20	78	92	63	68	79	398	215	152	250	158	144	112	139
15	85	106	73	75	102	564	259	178	339	182	176	128	173
10	99	123	84	80	233	795	354	209	454	228	239	155	239
5	121	138	96	113	485	1,620	571	311	764	316	386	255	408

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 17 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,940
0.95	1.05	3,030
0.90	1.11	3,800
0.80	1.25	4,960
0.50	2	8,010
0.20	5	12,500
0.10	10	15,600
0.04	25	19,500
0.02	50	22,400
0.01	100	25,300
0.005	200	28,200

Magnitude and frequency of annual high discharges, based on period of record 1935-51

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	666	423	270	178
0.95	1.05	996	601	365	242
0.90	1.11	1,210	714	427	285
0.80	1.25	1,510	869	516	346
0.50	2	2,200	1,220	732	498
0.20	5	3,010	1,630	1,030	707
0.10	10	3,460	1,870	1,220	846
0.04	25	3,960	2,130	1,460	1,020
0.02	50	4,290	2,300	1,640	1,150
0.01	100	4,580	2,460	1,820	1,280
0.005	200	4,840	2,600	2,000	1,410

05389000 YELLOW RIVER AT ION, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1935 to March 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	11	12	13	14	14	15	15	16	17
0.02	50	12	13	15	16	16	16	17	18	19
0.05	20	14	15	17	18	18	19	20	22	23
0.10	10	16	17	19	20	21	22	24	26	28
0.20	5	19	20	22	23	24	26	28	31	36
0.50	2	25	27	29	30	34	38	41	46	57
0.80	1.25	32	35	38	41	48	54	59	66	88
0.90	1.11	36	41	44	49	57	65	71	80	110
0.96	1.04	41	48	52	58	69	80	87	97	137
0.98	1.02	44	53	58	66	79	92	99	110	157
0.99	1.01	47	58	64	74	89	103	112	123	178

Magnitude and frequency of seasonal low discharges, based on period of record October 1934 to September 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	14	15	15	18	17	17	19	22
0.02	50	15	16	17	19	19	20	22	25
0.05	20	17	19	19	21	24	25	28	32
0.10	10	19	21	22	24	29	31	34	39
0.20	5	21	24	26	28	36	39	43	50
0.50	2	27	32	34	41	56	61	65	77
0.80	1.25	35	42	46	67	83	92	96	120
0.90	1.11	40	48	53	90	102	112	117	150
0.96	1.04	46	56	63	127	125	138	144	190
0.98	1.02	50	62	69	162	143	158	163	221
0.99	1.01	55	68	76	205	161	177	183	252
		July-August-September				October-November-December			
0.01	100	13	14	16	16	11	14	15	16
0.02	50	15	16	18	19	12	15	16	17
0.05	20	18	19	22	24	14	18	19	20
0.10	10	22	23	26	28	16	20	21	23
0.20	5	27	29	32	36	19	23	25	27
0.50	2	41	43	47	54	26	32	34	39
0.80	1.25	61	65	69	82	35	45	49	57
0.90	1.11	76	80	84	101	41	55	61	70
0.96	1.04	94	100	103	126	48	69	76	86
0.98	1.02	108	115	117	145	53	80	90	99
0.99	1.01	123	131	132	164	57	91	104	112

05389500 MISSISSIPPI RIVER AT MCGREGOR, IOWA

LOCATION.—Lat 43°01'29", long 91°10'21", in SE1/4 SE1/4 sec. 22, T95N, R3W, Clayton County, Hydrologic Unit 07060001, on right bank in city park at east end of Main Street in McGregor, 2.6 mi upstream from Wisconsin River, 4.3 mi downstream from Yellow River, and at mile 633.4 upstream from Ohio River.

DRAINAGE AREA.—67,500 mi^2, approximately.

PERIOD OF RECORD.—August 1936 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 604.84 ft above sea level. Prior to June 1, 1937, and since June 2, 1939, auxiliary water-stage recorder; June 1, 1937 to June 1, 1939, auxiliary nonrecording gage 14.1 mi upstream in tailwater of dam 9, at datum 5.30 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum daily mean discharge, 276,000 ft^3/s, and maximum gage height, 25.38 ft, April 24, 1965; minimum daily discharge, 6,200 ft^3/s, December 9, 1936.

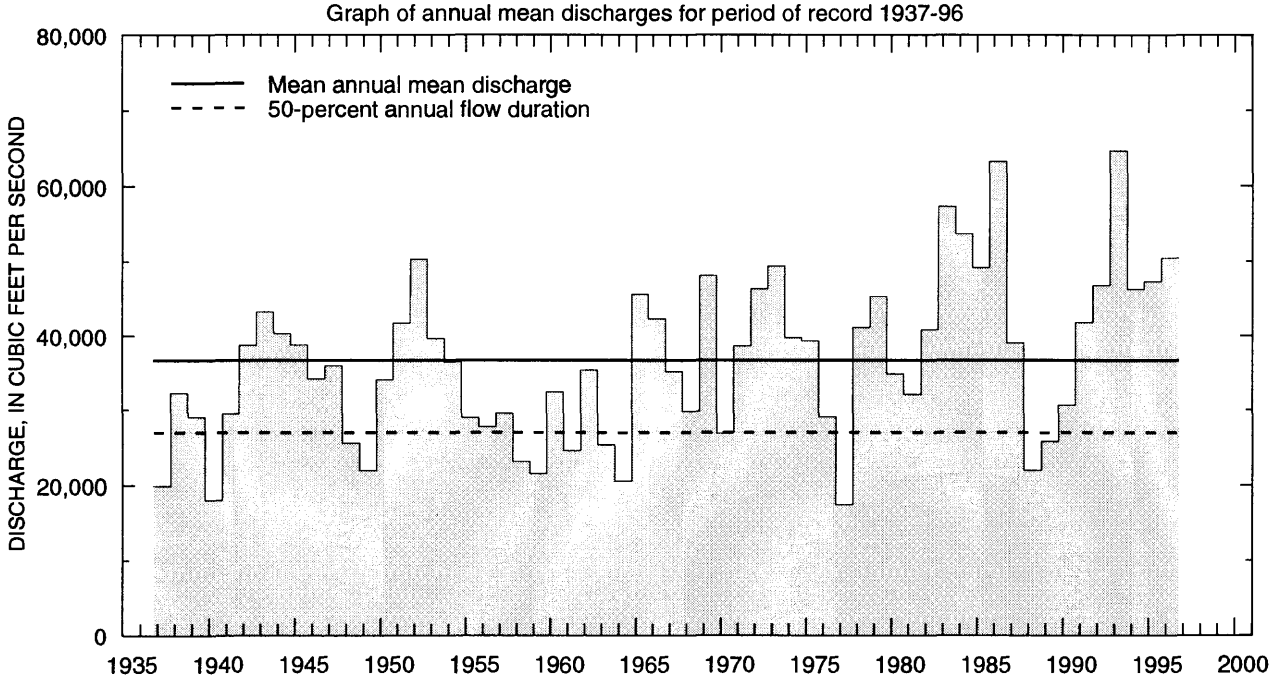
(Rating table not provided because discharge is
a function of both river stage and river slope.)

05389500 MISSISSIPPI RIVER AT MCGREGOR, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1937-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	114,600	1987	9,874	1937	28,920	18,580
November	64,840	1983	10,870	1938	29,090	14,240
December	59,200	1992	9,506	1937	22,030	9,718
January	35,700	1983	7,665	1940	19,010	6,596
February	48,540	1984	9,934	1940	19,520	7,715
March	103,800	1983	13,190	1940	39,230	18,140
April	164,800	1965	27,780	1990	74,110	30,760
May	119,200	1975	18,240	1977	61,200	26,930
June	112,600	1993	13,420	1988	49,160	21,170
July	142,200	1993	11,220	1988	40,220	23,110
August	84,430	1993	10,330	1964	27,550	14,930
September	72,890	1986	10,650	1940	29,170	14,570
Annual	64,720	1993	17,400	1977	36,640	10,920

Graph of annual mean discharges for period of record 1937-96



05389500 MISSISSIPPI RIVER AT MCGREGOR, IOWA—Continued

Monthly and annual flow durations, based on period of record 1937-96

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	9,080	9,900	7,880	7,720	9,280	11,600	19,300	14,900	12,300	9,800	8,930	9,500	9,300
95	10,700	11,500	10,200	9,700	10,600	14,000	27,600	19,200	16,000	11,700	10,800	10,900	11,500
90	12,500	13,400	11,300	11,500	12,100	15,800	33,000	24,700	19,000	14,000	12,100	12,400	13,100
85	13,600	15,000	12,400	12,400	12,500	18,000	36,800	28,800	22,500	16,200	13,200	13,700	14,600
80	14,500	16,400	13,700	12,900	13,100	19,500	42,100	33,300	27,500	18,400	14,600	15,100	16,000
75	15,400	17,700	14,900	13,600	13,800	20,900	47,100	36,900	32,300	20,500	15,700	16,200	17,200
70	16,400	18,800	15,600	14,500	14,400	22,400	51,500	41,000	35,600	22,400	17,000	17,400	18,800
60	18,700	20,900	17,000	16,000	16,000	25,500	61,600	48,500	40,500	28,400	20,500	20,600	22,200
50	21,800	23,600	19,000	17,100	17,100	30,000	71,200	56,200	44,600	34,300	23,800	23,800	27,000
40	26,400	28,100	21,000	19,000	19,000	36,100	78,200	65,900	50,000	40,000	27,500	28,100	33,500
30	33,700	34,500	24,600	22,000	20,700	44,200	85,900	76,000	57,600	48,900	31,400	33,400	41,600
25	36,900	37,600	27,100	23,400	22,000	50,000	92,500	80,700	63,100	53,400	33,500	37,500	46,700
20	41,000	41,000	30,000	25,000	24,000	57,500	98,900	87,700	69,600	59,400	36,500	41,300	54,100
15	45,400	45,300	32,900	26,500	26,000	65,300	105K	95,600	75,000	67,000	40,300	46,500	63,800
10	52,800	51,600	36,500	28,600	28,000	77,000	115K	102K	83,300	75,100	47,400	54,700	75,600
5	67,700	62,400	43,600	32,800	35,200	94,500	139K	114K	95,600	85,900	62,200	64,000	92,300

Magnitude and frequency of instantaneous peak discharges, based on period of peak-flow record 1880, 1937-95[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	45,300
0.95	1.05	58,200
0.90	1.11	66,600
0.80	1.25	78,300
0.50	2	107,000
0.20	5	145,000
0.10	10	171,000
0.04	25	203,000
0.02	50	226,000
0.01	100	250,000
0.005	200	274,000

Magnitude and frequency of annual high discharges, based on period of record 1937-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	44,000	42,000	39,200	33,400
0.95	1.05	57,600	55,500	51,900	45,400
0.90	1.11	66,300	64,200	60,100	52,900
0.80	1.25	78,400	76,300	71,300	63,200
0.50	2	107,000	105,000	97,800	86,700
0.20	5	146,000	142,000	132,000	115,000
0.10	10	170,000	166,000	153,000	132,000
0.04	25	201,000	195,000	179,000	151,000
0.02	50	223,000	216,000	197,000	165,000
0.01	100	245,000	236,000	215,000	177,000
0.005	200	266,000	256,000	232,000	188,000

[a] *Upper Mississippi River Water Surface Profiles, River Mile 0.0 to River Mile 847.5, Part I Flow Frequency Estimates Mississippi River Mile 202-840*, Technical Flood Plain Management Task Force of the Upper Mississippi River Basin Commission, 1979. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

05389500 MISSISSIPPI RIVER AT MCGREGOR, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1937 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,450	6,770	6,780	6,990	7,570	8,080	8,550	8,930	9,020
0.02	50	6,840	7,180	7,290	7,590	8,210	8,790	9,290	9,710	9,960
0.05	20	7,500	7,880	8,160	8,580	9,270	9,970	10,500	11,100	11,600
0.10	10	8,190	8,590	9,030	9,580	10,300	11,200	11,800	12,400	13,300
0.20	5	9,170	9,610	10,200	11,000	11,800	12,800	13,500	14,400	15,700
0.50	2	11,600	12,100	13,100	14,200	15,400	16,800	17,800	19,100	21,700
0.80	1.25	15,200	15,700	17,000	18,400	20,100	22,000	23,600	25,700	30,300
0.90	1.11	17,700	18,200	19,600	21,100	23,200	25,400	27,500	30,200	36,300
0.96	1.04	21,000	21,400	22,800	24,500	27,000	29,700	32,400	35,900	44,000
0.98	1.02	23,600	23,900	25,300	27,000	29,900	32,800	36,100	40,300	50,000
0.99	1.01	26,300	26,500	27,700	29,400	32,700	36,000	39,800	44,700	56,100

Magnitude and frequency of seasonal low discharges, based on period of record October 1936 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7,100	7,250	7,370	7,740	7,930	9,910	11,100	12,200
0.02	50	7,700	7,920	8,080	8,480	9,010	11,200	12,500	14,200
0.05	20	8,710	9,010	9,250	9,710	10,900	13,400	15,100	17,600
0.10	10	9,700	10,100	10,400	10,900	13,000	15,800	17,800	21,200
0.20	5	11,100	11,600	12,000	12,600	16,000	19,200	21,600	26,200
0.50	2	14,200	15,000	15,600	16,400	24,100	27,900	31,300	38,400
0.80	1.25	18,200	19,200	20,100	21,300	36,400	40,600	45,100	54,100
0.90	1.11	20,800	21,900	22,800	24,300	45,300	49,400	54,500	63,900
0.96	1.04	23,900	25,000	26,000	27,900	57,300	61,000	66,500	75,500
0.98	1.02	26,100	27,300	28,300	30,500	66,800	69,800	75,600	83,700
0.99	1.01	28,300	29,400	30,500	33,000	76,700	78,900	84,900	91,500
		July-August-September				October-November-December			
0.01	100	6,930	7,300	7,860	8,220	6,080	6,790	7,280	8,040
0.02	50	7,310	7,840	8,480	8,990	6,600	7,390	7,990	8,840
0.05	20	8,000	8,790	9,570	10,300	7,500	8,420	9,210	10,200
0.10	10	8,770	9,820	10,700	11,800	8,430	9,480	10,500	11,600
0.20	5	9,960	11,300	12,400	13,900	9,770	11,000	12,200	13,700
0.50	2	13,400	15,400	16,900	19,500	13,100	14,700	16,600	18,700
0.80	1.25	19,300	22,000	24,000	28,200	18,000	20,000	22,600	25,800
0.90	1.11	24,100	26,900	29,200	34,600	21,300	23,700	26,700	30,700
0.96	1.04	31,200	34,000	36,600	43,500	25,800	28,400	31,900	36,900
0.98	1.02	37,500	39,800	42,600	50,600	29,200	32,100	35,900	41,700
0.99	1.01	44,600	46,100	49,000	58,300	32,800	35,900	39,900	46,600

05411600 TURKEY RIVER AT SPILLVILLE, IOWA

LOCATION.—Lat 43°12'28", long 91°56'56", in SW1/4 NE1/4 sec. 19, T97N, R9W, Winneshiek County, Hydrologic Unit 07060004, on right bank 60 ft downstream from bridge on County Highway W14 at north edge of Spillville, 150 ft downstream from old mill dam, 0.6 mi upstream from Wonder Creek and at mile 98.5.

DRAINAGE AREA.—177 mi^2.

PERIOD OF RECORD.—June 1956 to September 1973, October 1977 to October 1991, February 1992 to March 1992 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,034.92 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,600 ft^3/s, July 12, 1972, gage height, 16.73 ft; maximum gage height, 16.76 ft, August 25, 1990; minimum daily discharge, 4.4 ft^3/s, February 1-3, 1959.

Selected values from rating table number 14, developed October 1981
(A discharge measurement to validate this rating has not been made since November 1991.)

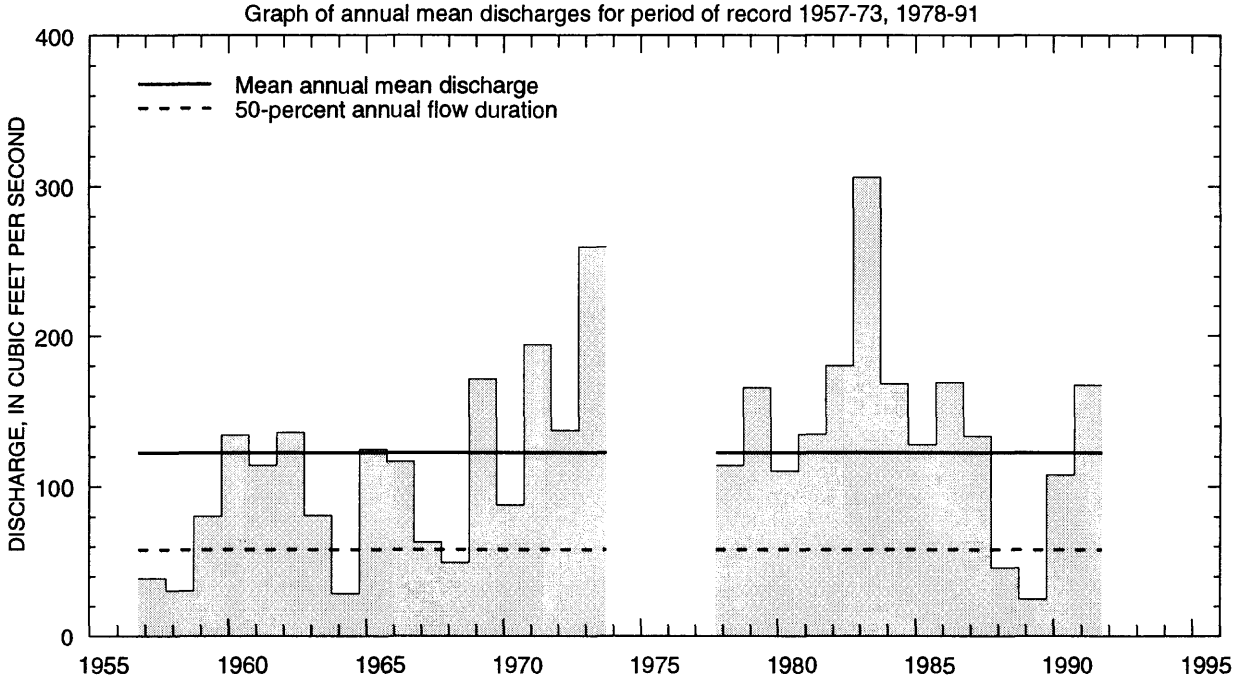
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.3	5.0	4.0	44.7
3.4	7.9	4.5	103
3.5	11.5	5.0	190
3.6	16.1	6.0	430
3.7	21.4	9.0	1,680
3.8	28.0	17.0	8,600

05411600 TURKEY RIVER AT SPILLVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1957-73, 1978-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	614	1987	10.7	1959	103	126
November	433	1983	13.2	1959	93.8	99.8
December	425	1983	7.79	1990	67.6	81.1
January	257	1973	5.53	1959	46.4	50.0
February	435	1985	4.84	1959	80.3	103
March	650	1961	16.9	1964	262	167
April	655	1965	30.1	1957	216	161
May	590	1983	25.6	1958	167	153
June	666	1969	19.3	1989	135	125
July	372	1972	9.66	1989	101	85.1
August	414	1990	8.86	1989	84.9	86.8
September	481	1972	12.5	1958	112	123
Annual	306	1983	25.0	1989	123	64.8

Graph of annual mean discharges for period of record 1957-73, 1978-91



05411600 TURKEY RIVER AT SPILLVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1957-73, 1978-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	9.5	9.4	6.9	5.1	4.6	8.4	18	20	14	8.8	7.4	10	7.6
95	12	13	9.0	8.4	10	16	28	27	21	15	11	12	12
90	13	14	11	10	14	22	41	34	26	21	15	15	16
85	17	17	13	12	15	26	52	42	33	30	20	20	20
80	20	20	16	15	18	30	62	48	38	33	24	23	25
75	22	25	22	18	21	39	71	54	42	35	29	28	30
70	26	35	26	20	24	54	85	62	48	38	32	32	34
60	43	47	33	25	28	76	110	77	63	48	42	38	44
50	59	58	41	30	31	105	142	95	80	66	49	49	58
40	71	74	48	34	35	150	172	125	101	77	58	61	74
30	92	88	60	40	45	227	207	161	130	91	67	88	100
25	102	100	69	50	50	271	238	188	147	103	75	100	119
20	116	115	80	58	62	346	275	215	170	116	86	116	146
15	142	155	106	65	86	430	329	268	204	141	102	142	186
10	217	204	144	80	130	614	412	352	245	183	132	190	247
5	344	285	190	150	306	1,040	651	522	328	280	204	325	400

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	298
0.95	1.05	625
0.90	1.11	902
0.80	1.25	1,370
0.50	2	2,850
0.20	5	5,410
0.10	10	7,290
0.04	25	9,770
0.02	50	11,700
0.01	100	13,500
0.005	200	15,400

Magnitude and frequency of annual high discharges, based on period of record 1957-73, 1978-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	193	122	76	53
0.95	1.05	367	234	152	107
0.90	1.11	506	323	212	149
0.80	1.25	732	467	310	216
0.50	2	1,400	887	586	402
0.20	5	2,470	1,550	992	661
0.10	10	3,240	2,010	1,250	821
0.04	25	4,240	2,600	1,560	1,000
0.02	50	4,980	3,030	1,780	1,120
0.01	100	5,710	3,450	1,980	1,230
0.005	200	6,450	3,870	2,160	1,330

05411600 TURKEY RIVER AT SPILLVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1957 to March 1973, April 1978 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.3	3.5	3.5	3.8	4.1	4.8	5.3	5.6	6.0
0.02	50	4.2	4.4	4.5	4.7	5.2	6.0	6.6	7.1	7.5
0.05	20	5.8	6.1	6.2	6.6	7.4	8.4	9.2	10	11
0.10	10	7.8	8.1	8.2	8.7	9.9	11	12	14	15
0.20	5	11	11	11	12	14	15	17	20	23
0.50	2	19	19	20	21	24	28	32	38	50
0.80	1.25	31	32	33	35	39	47	59	73	101
0.90	1.11	39	40	41	44	49	61	79	100	144
0.96	1.04	49	50	52	55	61	79	108	140	206
0.98	1.02	56	57	59	63	69	93	131	173	259
0.99	1.01	63	63	66	71	76	107	155	209	315

Magnitude and frequency of seasonal low discharges, based on period of record July 1956 to September 1973, October 1977 to September 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.9	4.1	4.3	5.1	8.9	9.5	9.8	13
0.02	50	4.7	5.0	5.2	6.2	11	12	12	16
0.05	20	6.2	6.7	7.0	8.3	14	16	16	22
0.10	10	8.1	8.6	9.1	11	19	20	22	28
0.20	5	11	12	12	15	25	28	30	39
0.50	2	20	21	23	27	45	50	56	70
0.80	1.25	37	39	41	48	79	90	104	128
0.90	1.11	51	53	56	65	106	121	144	175
0.96	1.04	72	74	77	90	144	167	204	243
0.98	1.02	90	92	95	112	176	205	254	300
0.99	1.01	110	112	115	135	209	246	310	363
		July-August-September				October-November-December			
0.01	100	5.2	5.6	5.8	6.5	4.0	4.4	4.6	5.2
0.02	50	6.6	7.1	7.4	8.2	5.0	5.6	5.9	6.6
0.05	20	9.4	10	10	12	7.1	7.9	8.3	9.2
0.10	10	13	13	14	15	9.6	11	11	13
0.20	5	17	18	19	22	14	15	16	18
0.50	2	29	31	34	38	27	29	32	37
0.80	1.25	44	47	53	64	51	55	61	76
0.90	1.11	53	57	66	81	71	75	85	111
0.96	1.04	62	68	81	102	100	105	121	166
0.98	1.02	68	76	91	118	124	129	150	216
0.99	1.01	74	82	100	133	150	154	183	273

05412000 TURKEY RIVER AT ELKADER, IOWA

LOCATION.—Lat 42°51'15", long 91°24'15", in SE1/4 SW1/4 sec. 23, T93N, R5W, Clayton County, Hydrologic Unit 07060004, in tailrace of Central States Power and Light Corporation's hydroelectric plant in Elkader.

DRAINAGE AREA.—891 mi^2.

PERIOD OF RECORD.—October 1932 to September 1942 (discontinued).

GAGE.—Wire-weight gage. Datum of gage is 701.61 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge observed, 19,300 ft^3/s, May 31, 1941, head gage height, 19.1 ft; minimum daily discharge, 21 ft^3/s, January 23, 26, 29, 31, 1940.

Selected values from rating table
developed October 1938
(A discharge measurement to validate this rating
has not been made since August 1942.)

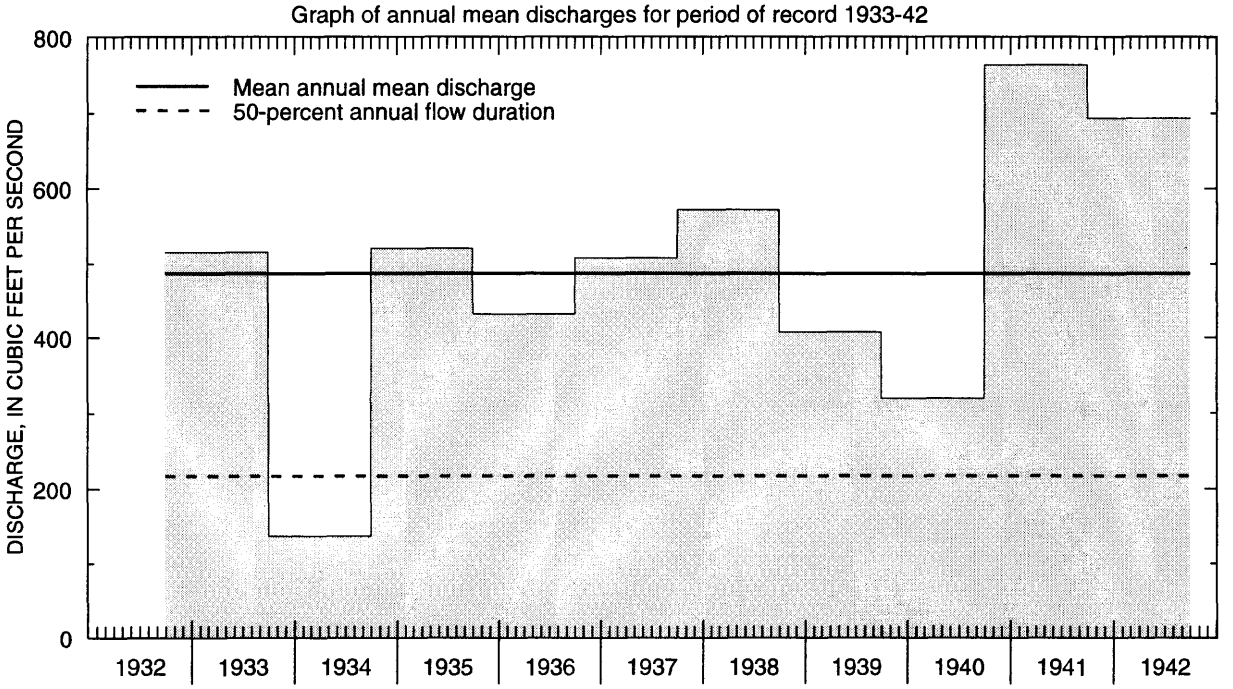
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.8	11	7.6	180
7.0	26	7.8	264
7.2	60		

05412000 TURKEY RIVER AT ELKADER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1933-42

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	364	1939	83.6	1934	175	96.2
November	842	1939	71.5	1934	278	242
December	563	1933	52.6	1938	232	173
January	717	1941	33.9	1940	241	195
February	877	1938	40.3	1940	353	282
March	2,723	1936	92.3	1934	1,315	829
April	1,582	1933	298	1940	685	407
May	1,654	1941	65.6	1934	544	458
June	2,141	1941	81.4	1934	635	650
July	1,311	1942	74.4	1936	479	381
August	1,461	1942	99.6	1933	454	517
September	1,745	1938	79.3	1933	443	539
Annual	764	1941	137	1934	487	179

Graph of annual mean discharges for period of record 1933-42



05412000 TURKEY RIVER AT ELKADER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1933-42

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	60	46	34	21	32	64	93	34	25	30	36	53	33
95	72	64	44	37	37	82	154	68	43	52	48	63	52
90	80	72	56	37	48	96	208	98	69	64	57	71	69
85	85	80	63	50	53	142	264	131	91	73	76	77	81
80	91	86	68	65	68	182	286	174	130	82	91	84	92
75	100	91	80	84	86	241	311	195	150	106	103	87	107
70	102	102	85	100	100	311	346	238	180	140	117	92	124
60	116	132	105	115	150	449	426	273	220	184	141	117	168
50	136	160	140	142	181	657	491	326	280	228	180	148	217
40	166	193	189	188	232	955	564	382	353	262	220	216	281
30	188	239	236	230	312	1,240	675	442	511	356	288	340	376
25	201	297	260	260	361	1,410	756	486	603	434	386	440	453
20	211	338	284	307	439	1,910	877	560	758	530	586	603	571
15	260	426	360	350	586	2,480	999	667	989	713	685	801	743
10	334	629	390	610	770	3,250	1,170	820	1,360	993	1,070	1,100	1,020
5	375	1,040	467	891	1,350	4,520	1,470	1,360	2,500	1,760	1,860	2,200	1,690

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 10 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	3,290
0.95	1.05	4,970
0.90	1.11	6,120
0.80	1.25	7,780
0.50	2	12,000
0.20	5	17,600
0.10	10	21,300
0.04	25	25,700
0.02	50	28,900
0.01	100	31,900
0.005	200	34,800

Magnitude and frequency of annual high discharges, based on period of record 1933-42

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	909	704	341	189
0.95	1.05	1,590	1,220	780	492
0.90	1.11	2,120	1,620	1,140	751
0.80	1.25	3,000	2,230	1,680	1,160
0.50	2	5,670	3,970	3,030	2,120
0.20	5	10,500	6,680	4,460	3,010
0.10	10	14,200	8,580	5,110	3,340
0.04	25	19,600	11,000	5,670	3,580
0.02	50	24,100	12,900	5,950	3,680
0.01	100	28,800	14,700	6,150	3,740
0.005	200	33,900	16,500	6,290	3,770

05412000 TURKEY RIVER AT ELKADER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1933 to March 1942

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	17	18	21	23	25	28	32	34	40
0.02	50	18	20	22	25	27	30	35	39	46
0.05	20	20	23	24	27	31	36	44	48	56
0.10	10	22	26	27	31	35	42	53	59	69
0.20	5	26	30	32	36	41	52	66	76	89
0.50	2	37	42	47	54	65	83	103	129	157
0.80	1.25	61	67	77	93	117	149	176	237	300
0.90	1.11	83	90	106	132	169	211	241	334	437
0.96	1.04	122	130	155	200	263	315	346	493	672
0.98	1.02	159	170	203	270	360	416	444	642	902
0.99	1.01	206	219	263	360	488	542	562	821	1,190

Magnitude and frequency of seasonal low discharges, based on period of record October 1932 to September 1942

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	10	14	15	17	11	16	20	23
0.02	50	13	18	19	22	17	23	29	33
0.05	20	19	25	27	33	30	39	47	56
0.10	10	27	34	37	47	47	60	69	84
0.20	5	39	48	52	69	75	93	105	129
0.50	2	74	87	95	134	154	182	203	255
0.80	1.25	128	147	160	233	250	292	329	417
0.90	1.11	165	188	205	300	298	348	398	504
0.96	1.04	211	239	260	383	342	402	469	590
0.98	1.02	245	277	300	441	365	431	510	640
0.99	1.01	277	313	338	497	382	454	544	680
		July-August-September				October-November-December			
0.01	100	24	34	37	40	18	21	28	32
0.02	50	25	35	38	41	21	25	33	38
0.05	20	27	38	42	45	27	34	42	48
0.10	10	31	42	48	56	34	43	51	59
0.20	5	37	50	57	75	44	58	65	76
0.50	2	60	79	93	144	70	95	103	121
0.80	1.25	124	162	188	313	107	148	161	192
0.90	1.11	202	262	300	494	132	183	202	242
0.96	1.04	370	479	531	838	163	226	258	310
0.98	1.02	572	743	803	1,210	187	257	301	363
0.99	1.01	876	1,140	1,200	1,700	209	287	345	418

05412060 SILVER CREEK NEAR LUANA, IOWA

LOCATION.—Lat 43°01'19", long 91°29'21", in NE1/4 sec. 25, T95N., R6W, Clayton County, Hydrologic Unit 07060004, on right upstream bank at bridge on County Road W70, 2.3 miles south of Highway 52 and 18, and 3.2 miles south of Luana.

DRAINAGE AREA.—4.39 mi^2.

PERIOD OF RECORD.—May 1986 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1027.57 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 3,300 ft^3/s, June 15, 1991, gage height, 11.58 ft; no flow August 21, 1989, December 12, 1989–January 7, 1990, January 12–15, 24–February 4, 1990.

Selected values from rating table number 1, developed March 1986

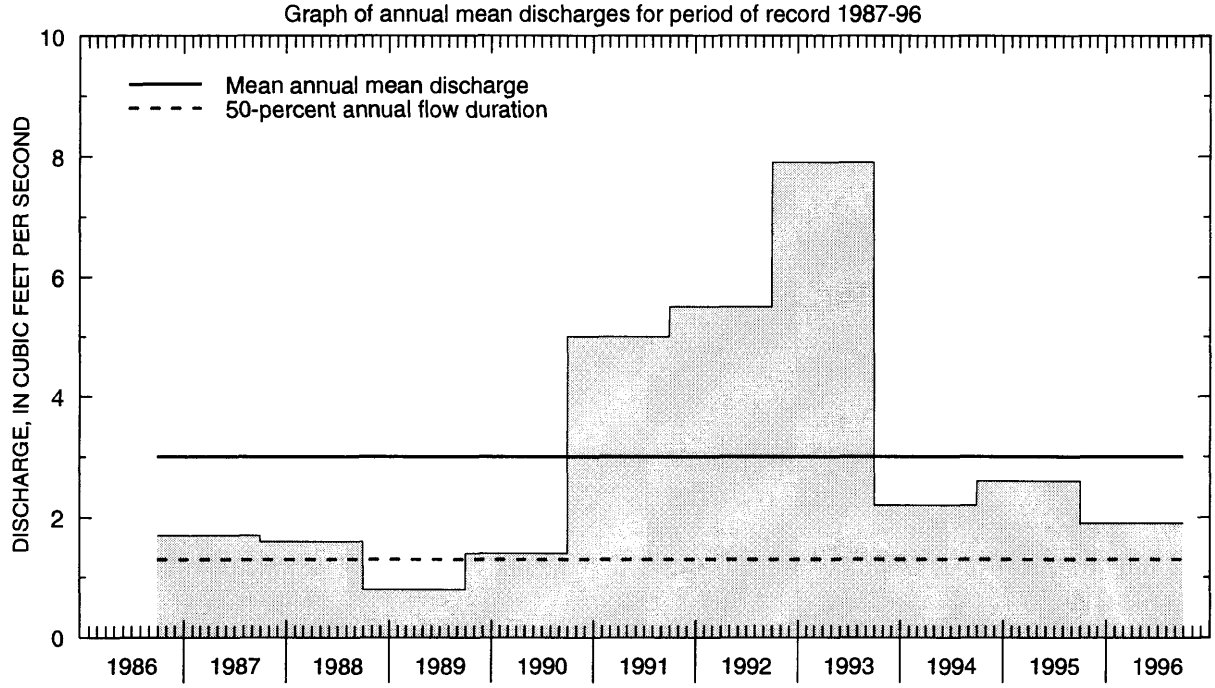
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.5	0.38	6.7	192
5.7	3.0	9.0	408
5.9	9.5	14.0	2,020
6.3	40	14.5	2,500
6.6	101	14.98	3,320

05412060 SILVER CREEK NEAR LUANA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1987-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2.80	1994	0.12	1990	1.21	0.94
November	11.1	1992	0.11	1990	2.35	3.41
December	9.34	1992	0.023	1990	2.04	2.95
January	5.21	1992	0.006	1990	1.53	1.53
February	5.64	1992	0.18	1990	1.76	1.59
March	17.7	1993	2.06	1996	5.35	4.58
April	12.1	1993	0.12	1989	4.63	4.21
May	8.17	1993	0.20	1989	3.14	2.62
June	32.3	1991	0.16	1989	6.87	9.82
July	14.0	1993	0.14	1989	2.83	4.03
August	6.74	1993	0.18	1988	2.44	2.39
September	8.65	1992	0.24	1989	2.30	2.62
Annual	7.90	1993	0.76	1989	3.04	2.30

Graph of annual mean discharges for period of record 1987-96



05412060 SILVER CREEK NEAR LUANA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1987-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.07	0.06	0.00	0.00	0.00	0.08	0.05	0.16	0.09	0.04	0.01	0.06	0.00
95	0.10	0.10	0.00	0.00	0.02	0.22	0.11	0.20	0.13	0.16	0.03	0.09	0.09
90	0.14	0.16	0.08	0.02	0.13	0.32	0.21	0.25	0.37	0.27	0.13	0.12	0.17
85	0.22	0.21	0.16	0.11	0.19	0.66	0.27	0.41	0.70	0.52	0.21	0.24	0.28
80	0.34	0.41	0.25	0.41	0.34	1.0	0.52	0.91	0.95	0.66	0.40	0.56	0.48
75	0.43	0.52	0.42	0.48	0.38	1.2	1.3	1.0	1.1	0.88	0.80	0.67	0.62
70	0.60	0.57	0.53	0.52	0.54	1.4	1.3	1.1	1.3	0.97	0.92	0.79	0.80
60	0.78	0.79	0.73	0.71	0.71	1.7	1.6	1.4	2.0	1.2	1.1	0.84	1.0
50	0.97	0.98	0.84	0.80	0.97	2.3	2.3	2.1	2.7	1.4	1.3	1.0	1.3
40	1.2	1.2	1.2	0.95	1.3	3.0	3.2	3.2	3.4	1.7	1.5	1.3	1.7
30	1.4	1.7	1.5	1.4	1.8	4.1	5.5	4.6	5.0	2.0	1.8	2.0	2.4
25	1.6	2.0	1.7	1.6	2.0	4.6	6.6	5.2	5.5	2.4	2.0	2.4	3.0
20	2.3	2.5	3.0	2.4	2.4	5.2	8.0	5.4	5.8	3.3	2.5	3.3	3.9
15	2.4	4.0	5.0	3.1	2.6	6.3	9.0	6.0	6.7	4.4	3.5	4.1	5.1
10	2.7	6.2	6.3	4.0	3.4	7.6	11	6.9	7.8	5.6	5.0	5.0	6.1
5	3.0	7.9	7.9	5.9	5.5	21	16	8.5	12	8.7	6.3	5.8	8.6

(Flood frequencies not computed because only 9 years of peak-flow data were available for analysis.)

Magnitude and frequency of annual high discharges, based on period of record 1987-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	12	7.5	4.8	2.7
0.95	1.05	14	8.5	5.5	3.4
0.90	1.11	15	9.4	6.2	4.0
0.80	1.25	18	11	7.4	5.0
0.50	2	30	18	12	8.2
0.20	5	66	38	23	15
0.10	10	115	62	35	23
0.04	25	232	117	59	35
0.02	50	387	184	85	49
0.01	100	640	288	123	66
0.005	200	1,050	446	177	87

05412060 SILVER CREEK NEAR LUANA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1987 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.05
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.10
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.13	0.17
0.20	5	0.06	0.07	0.09	0.13	0.18	0.25	0.26	0.27	0.33
0.50	2	0.39	0.42	0.47	0.53	0.59	0.80	0.83	0.86	1.0
0.80	1.25	0.92	0.97	1.0	1.1	1.2	1.6	2.0	2.0	2.8
0.90	1.11	1.2	1.3	1.3	1.5	1.7	2.1	2.7	2.8	4.4
0.96	1.04	1.4	1.5	1.6	1.9	2.2	2.6	3.4	3.8	6.9
0.98	1.02	1.5	1.6	1.7	2.1	2.6	3.0	3.8	4.5	8.9
0.99	1.01	1.6	1.7	1.7	2.2	3.0	3.3	4.2	5.1	11

Magnitude and frequency of seasonal low discharges, based on period of record June 1986 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.04
0.02	50	0.00	0.00	0.00	0.00	0.02	0.03	0.03	0.06
0.05	20	0.00	0.00	0.00	0.00	0.06	0.07	0.09	0.13
0.10	10	0.00	0.00	0.00	0.00	0.13	0.16	0.18	0.25
0.20	5	0.09	0.13	0.17	0.25	0.29	0.36	0.41	0.50
0.50	2	0.57	0.63	0.70	0.75	1.0	1.2	1.4	1.6
0.80	1.25	1.2	1.3	1.5	1.7	2.5	3.0	3.5	4.0
0.90	1.11	1.4	1.6	1.9	2.5	3.5	4.2	5.0	5.9
0.96	1.04	1.5	1.8	2.3	3.6	4.7	5.6	6.8	8.5
0.98	1.02	1.6	1.9	2.5	4.5	5.4	6.5	7.9	10
0.99	1.01	1.6	2.0	2.7	5.5	6.0	7.2	8.9	12
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01
0.05	20	0.00	0.00	0.04	0.07	0.00	0.00	0.00	0.04
0.10	10	0.02	0.03	0.09	0.15	0.00	0.00	0.00	0.09
0.20	5	0.17	0.19	0.21	0.30	0.14	0.20	0.22	0.23
0.50	2	0.67	0.72	0.75	0.93	0.54	0.67	0.72	0.84
0.80	1.25	1.3	1.6	1.8	2.1	1.1	1.3	1.5	1.8
0.90	1.11	1.6	2.1	2.4	2.8	1.5	1.7	2.0	2.3
0.96	1.04	1.8	2.6	3.0	3.7	1.9	2.0	2.6	2.6
0.98	1.02	1.9	3.0	3.4	4.2	2.2	2.3	2.5	2.8
0.99	1.01	2.0	3.3	3.7	4.6	2.4	2.4	2.7	2.9

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IOWA

LOCATION.—Lat 42°55'49", long 91°23'03", in SW1/4 NW1/4 sec. 25, T94N, R5W, Clayton County, Hydrologic Unit, 07060004, on left downstream bank at bridge on County Road X28, 0.1 mi north of County Road B65, on north edge of Saint Olaf.

DRAINAGE AREA.—70.7 mi^2.

PERIOD OF RECORD.—September 1957 to July 1977 (operated as a low-flow station only), March 1986 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 826.73 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 19,600 ft^3/s, June 15, 1991, gage height, 27.88 ft; no flow many days during the period July 1989–January 1990, several days in 1991.

Selected values from rating table number 7, developed September 1991

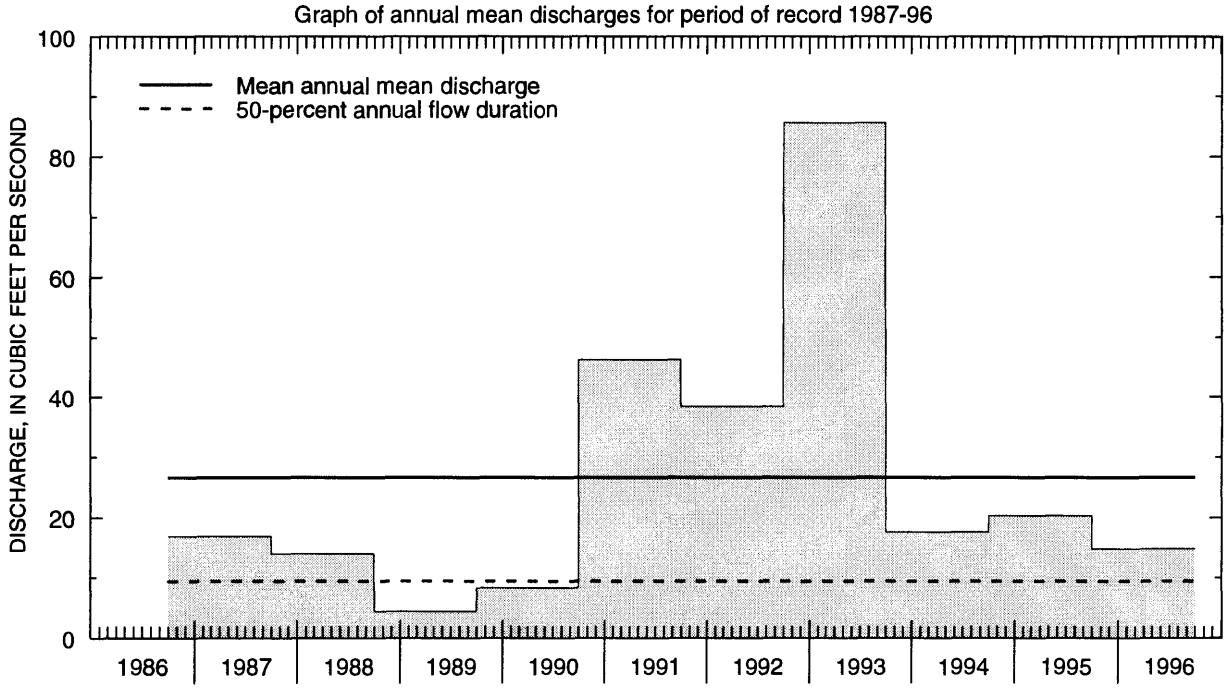
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
11.2	1.0	19.0	3,480
12.0	32	21.0	6,000
13.0	111	23.0	8,980
15.0	530	25.0	12,700
17.0	1,790	27.0	17,300

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1987-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	25.8	1994	0.075	1990	9.43	8.69
November	82.5	1992	0.003	1990	19.8	25.2
December	65.7	1992	0.000	1990	16.4	22.1
January	38.9	1992	0.11	1991	9.10	11.4
February	48.4	1992	0.15	1991	12.5	13.8
March	198	1993	23.3	1996	55.6	51.4
April	167	1993	1.63	1989	50.2	52.5
May	88.5	1993	0.86	1989	28.0	28.8
June	313	1991	0.29	1989	57.1	96.2
July	192	1993	0.10	1989	28.0	58.1
August	87.4	1993	0.86	1988	18.4	26.8
September	49.9	1993	0.53	1989	15.2	17.2
Annual	85.6	1993	4.36	1989	26.6	24.4

Graph of annual mean discharges for period of record 1987-96



05412100 ROBERTS CREEK ABOVE SAINT OLAF, IOWA—Continued

Monthly and annual flow durations, based on period of record 1987-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.01	0.80	0.23	0.09	0.06	0.00	0.00	0.00	0.00
95	0.05	0.00	0.00	0.02	0.04	2.0	0.75	0.29	0.13	0.04	0.00	0.03	0.05
90	0.23	0.17	0.02	0.09	0.47	5.5	1.7	1.2	1.9	0.79	0.15	0.06	0.33
85	0.45	2.3	0.59	0.15	0.72	7.4	2.6	2.2	3.0	1.9	0.40	0.11	1.0
80	1.5	3.0	0.80	0.52	1.0	10	6.9	7.2	4.6	2.6	0.80	0.94	2.4
75	2.8	3.3	1.1	1.0	2.1	17	12	9.0	6.0	3.5	1.4	2.2	3.4
70	3.2	5.4	2.1	3.0	3.9	20	15	9.8	6.7	5.3	2.9	2.7	4.6
60	5.1	7.8	5.2	4.2	6.0	25	19	11	9.4	7.4	4.4	3.9	6.9
50	5.9	11	7.3	5.6	7.4	30	23	15	15	8.8	5.5	6.3	9.4
40	8.7	13	9.7	6.5	8.6	38	33	21	19	11	7.4	8.4	13
30	12	18	16	8.8	10	49	56	33	31	13	9.9	12	20
25	14	20	19	9.8	13	53	70	39	39	16	11	18	25
20	16	21	23	12	15	61	86	44	46	19	18	32	33
15	21	30	43	15	18	72	102	51	55	26	29	41	45
10	25	52	50	25	29	97	138	61	77	70	53	47	58
5	27	69	62	36	58	154	189	90	120	134	89	56	93

(Flood frequencies not computed because only 9 years of peak-flow data were available for analysis.)

Magnitude and frequency of annual high discharges, based on period of record 1987-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	95	61	41	22
0.95	1.05	102	66	45	27
0.90	1.11	110	72	50	31
0.80	1.25	127	83	58	38
0.50	2	211	137	93	66
0.20	5	522	315	197	140
0.10	10	1,010	573	330	228
0.04	25	2,360	1,230	630	411
0.02	50	4,450	2,180	1,010	626
0.01	100	8,370	3,830	1,620	941
0.005	200	15,700	6,690	2,570	1,400

05412100 ROBERTS CREEK ABOVE SAINT OLAF, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1986 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.46
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.98
0.20	5	0.00	0.00	0.00	0.05	0.11	0.43	0.92	1.1	2.2
0.50	2	1.0	1.1	1.2	1.3	1.5	3.5	5.1	6.3	8.1
0.80	1.25	5.1	5.5	5.8	6.3	7.2	9.6	12	15	21
0.90	1.11	6.7	7.2	11	12	13	14	15	19	30
0.96	1.04	7.7	8.2	18	19	22	23	27	33	41
0.98	1.02	8.0	8.5	22	25	29	31	43	46	48
0.99	1.01	8.2	8.6	26	30	36	39	45	49	54

Magnitude and frequency of seasonal low discharges, based on period of record April 1986 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.07
0.02	50	0.00	0.00	0.00	0.01	0.03	0.05	0.07	0.16
0.05	20	0.00	0.00	0.01	0.05	0.14	0.19	0.23	0.44
0.10	10	0.00	0.00	0.05	0.16	0.42	0.55	0.62	1.0
0.20	5	0.00	0.00	0.23	0.56	1.3	1.6	1.8	2.5
0.50	2	3.2	3.7	3.7	3.8	6.6	7.8	8.6	11
0.80	1.25	8.1	9.5	14	15	17	21	25	31
0.90	1.11	11	13	26	27	22	28	36	47
0.96	1.04	15	17	43	45	27	36	48	68
0.98	1.02	17	20	56	57	29	40	56	82
0.99	1.01	19	23	67	69	30	42	62	95
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.01	0.19	0.00	0.00	0.00	0.00
0.20	5	0.02	0.09	0.18	0.50	0.35	0.44	0.56	0.90
0.50	2	1.7	1.8	2.3	2.8	2.7	3.3	3.8	4.9
0.80	1.25	8.5	11	11	13	8.3	9.5	11	13
0.90	1.11	13	21	22	26	12	14	16	18
0.96	1.04	19	35	39	53	17	18	21	23
0.98	1.02	22	47	53	80	20	21	24	27
0.99	1.01	24	58	68	115	23	23	27	29

05412500 TURKEY RIVER AT GARBER, IOWA

LOCATION.—Lat 42°44'24", long 91°15'42", in SE1/4 NW1/4 sec.36, T92N, R4W, Clayton County, Hydrologic Unit 07060004, on right bank 10 ft upstream from bridge on County Highway C43, 800 ft upstream from Wayman Creek, 1,000 ft southeast of Garber, 2,000 ft downstream from Elk Creek, 1 mi downstream from Volga River, and 21.2 mi upstream from mouth (revised).

DRAINAGE AREA.—1,545 mi^2.

PERIOD OF RECORD.—August 1913 to November 1916, May 1919 to September 1927, April 1929 to September 1930, October 1932 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 634.46 ft above sea level. Prior to Feb. 7, 1935, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 49,900 ft^3/s, June 15, 1991, gage height, 30.10 ft; minimum daily discharge, 49 ft^3/s, January 28, 1940.

Selected values from rating table number 12, developed October 1990

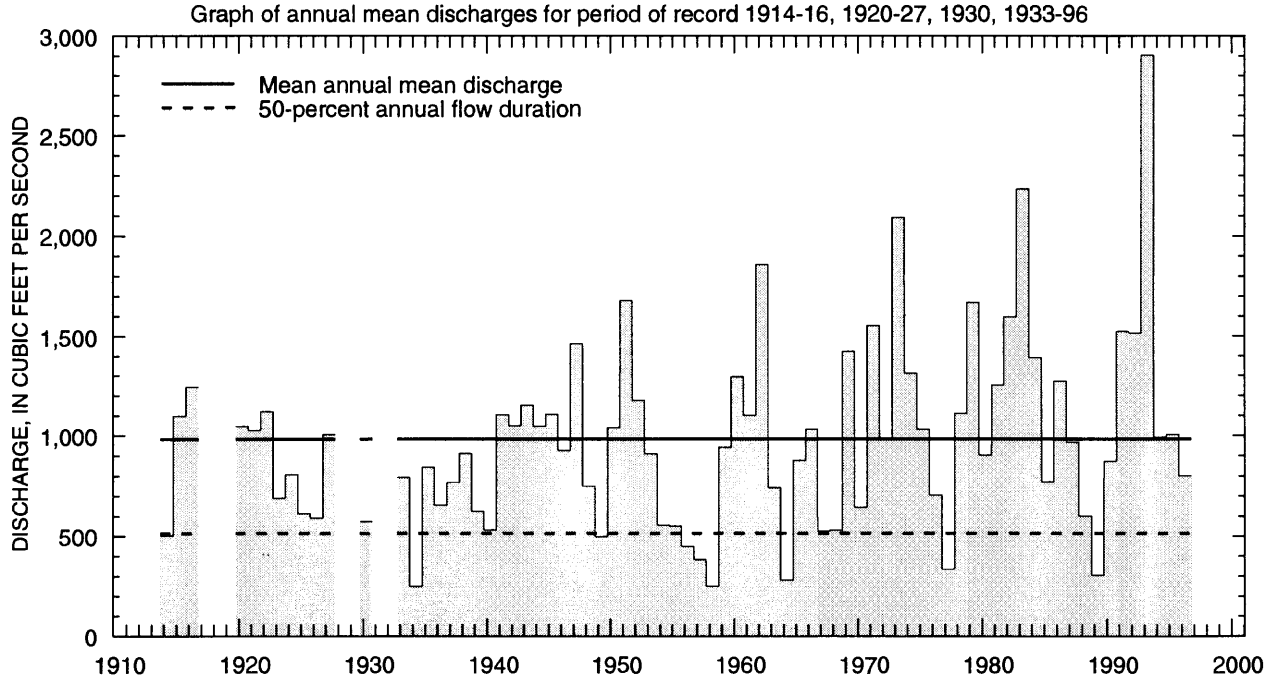
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.6	84	15.0	6,935
6.0	183	18.0	11,100
8.0	955	21.0	16,440
10.0	2,170	25.0	28,600
12.0	3,730	30.10	49,900

05412500 TURKEY RIVER AT GARBER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1914-16, 1920-27, 1930, 1933-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,527	1987	88.2	1950	566	494
November	2,834	1962	92.2	1950	614	569
December	2,889	1983	78.5	1959	483	475
January	3,306	1916	62.0	1940	519	534
February	4,265	1922	60.9	1959	826	711
March	4,832	1979	188	1934	2,039	1,192
April	6,382	1951	288	1957	1,684	1,288
May	3,896	1983	95.7	1934	1,282	921
June	5,316	1947	103	1934	1,342	1,033
July	5,772	1993	121	1936	938	843
August	5,119	1993	140	1964	855	932
September	3,011	1938	108	1958	650	576
Annual	2,905	1993	249	1934	983	472

Graph of annual mean discharges for period of record 1914-16, 1920-27, 1930, 1933-96



05412500 TURKEY RIVER AT GARBER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1914-16, 1920-27, 1930, 1933-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	87	90	70	62	62	120	204	107	89	107	94	96	86
95	118	124	98	98	105	200	286	218	195	150	131	115	124
90	141	150	120	120	140	270	373	316	258	203	164	135	165
85	163	174	157	140	174	330	467	365	302	238	186	166	200
80	187	203	175	164	200	410	550	422	358	274	212	202	240
75	224	225	193	180	225	500	615	481	415	313	242	239	275
70	254	262	223	201	250	605	689	550	496	365	288	265	313
60	317	340	270	250	310	830	850	686	646	473	378	325	404
50	370	412	330	300	390	1,100	1,070	839	834	584	462	393	515
40	464	498	410	380	500	1,430	1,360	1,060	1,060	719	560	468	660
30	599	639	500	450	660	1,910	1,710	1,350	1,340	877	665	571	856
25	673	712	550	520	760	2,300	1,930	1,560	1,500	979	738	664	1,010
20	761	800	600	583	931	2,690	2,240	1,830	1,750	1,110	844	795	1,230
15	916	900	698	660	1,200	3,310	2,690	2,220	2,080	1,340	1,060	1,000	1,560
10	1,140	1,190	812	883	1,790	4,630	3,470	2,700	2,610	1,770	1,530	1,360	2,070
5	1,490	1,750	1,290	1,460	3,150	7,760	5,090	3,810	3,960	2,880	2,990	1,960	3,290

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 82 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	7,390
0.90	1.11	8,710
0.80	1.25	10,600
0.50	2	15,100
0.20	5	21,000
0.10	10	24,800
0.04	25	29,300
0.02	50	32,600
0.01	100	35,800
0.005	200	38,900

Magnitude and frequency of annual high discharges, based on period of record 1914-16, 1920-27, 1930, 1933-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2,130	1,410	922	632
0.95	1.05	3,480	2,350	1,570	1,110
0.90	1.11	4,430	3,010	2,030	1,450
0.80	1.25	5,840	3,990	2,700	1,940
0.50	2	9,430	6,430	4,350	3,130
0.20	5	14,300	9,610	6,410	4,560
0.10	10	17,400	11,500	7,600	5,340
0.04	25	21,100	13,700	8,900	6,150
0.02	50	23,700	15,100	9,730	6,660
0.01	100	26,100	16,500	10,500	7,090
0.005	200	28,400	17,700	11,100	7,460

05412500 TURKEY RIVER AT GARBER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1914 to March 1916, April 1920 to March 1927, April 1933 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	40	42	43	45	51	58	64	70	77
0.02	50	47	49	52	54	61	69	78	85	94
0.05	20	61	64	67	71	79	91	103	114	128
0.10	10	76	80	84	89	100	115	131	147	167
0.20	5	99	104	110	117	131	151	175	197	229
0.50	2	162	170	181	193	216	255	297	338	409
0.80	1.25	262	273	288	308	349	422	491	560	713
0.90	1.11	335	347	363	389	445	545	633	719	943
0.96	1.04	434	445	462	495	571	713	822	929	1,260
0.98	1.02	511	522	538	576	669	846	970	1,090	1,510
0.99	1.01	591	600	615	657	769	985	1,120	1,250	1,780

Magnitude and frequency of seasonal low discharges, based on period of record September 1913 to October 1916, July 1919 to September 1927, July 1929 to September 1930, October 1932 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	48	53	55	61	65	80	90	108
0.02	50	57	63	65	73	82	99	111	135
0.05	20	74	81	85	96	114	136	152	187
0.10	10	93	101	107	123	152	179	199	249
0.20	5	122	132	140	165	214	247	275	348
0.50	2	201	218	234	292	396	448	501	643
0.80	1.25	327	357	384	520	706	789	897	1,150
0.90	1.11	420	460	495	703	941	1,050	1,210	1,540
0.96	1.04	544	601	645	973	1,270	1,410	1,640	2,080
0.98	1.02	642	713	765	1,200	1,520	1,690	2,000	2,510
0.99	1.01	744	830	889	1,450	1,790	1,990	2,380	2,960
		July-August-September				October-November-December			
0.01	100	52	65	70	81	46	52	56	62
0.02	50	62	75	81	95	56	63	67	75
0.05	20	79	94	101	121	73	83	89	101
0.10	10	98	115	124	150	93	106	114	129
0.20	5	129	147	159	195	124	142	152	174
0.50	2	217	241	262	326	212	241	259	301
0.80	1.25	370	404	440	547	356	397	429	504
0.90	1.11	490	535	582	720	464	510	553	653
0.96	1.04	663	725	789	966	612	661	720	853
0.98	1.02	807	887	963	1,170	730	778	849	1,010
0.99	1.01	964	1,070	1,160	1,390	854	898	982	1,170

05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IOWA

LOCATION.—Lat 42°33'18", long 90°44'46", in NW1/4 NE1/4 sec.5, T89N, R2E, Dubuque County, Hydrologic Unit 07060003, on left bank 10 ft upstream from bridge on county highway, 300 ft upstream from Cloie Branch, 1.7 mi east of Durango, 5.6 mi northwest of court house at Dubuque and 6.4 mi upstream from mouth.

DRAINAGE AREA.—130 mi^2.

PERIOD OF RECORD.—October 1934 to January 1982 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 612.03 ft above sea level. Prior to Jan. 5, 1939, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 40,000 ft^3/s, August 2, 1972, gage height, 23.13 ft; minimum daily discharge, 5 ft^3/s, July 12 and 13, 1936.

REMARKS.—Gaging-station reactivated September 1996.

Selected values from rating table number 7, developed August 1972
(A discharge measurement to validate this rating has not been made since December 1982)

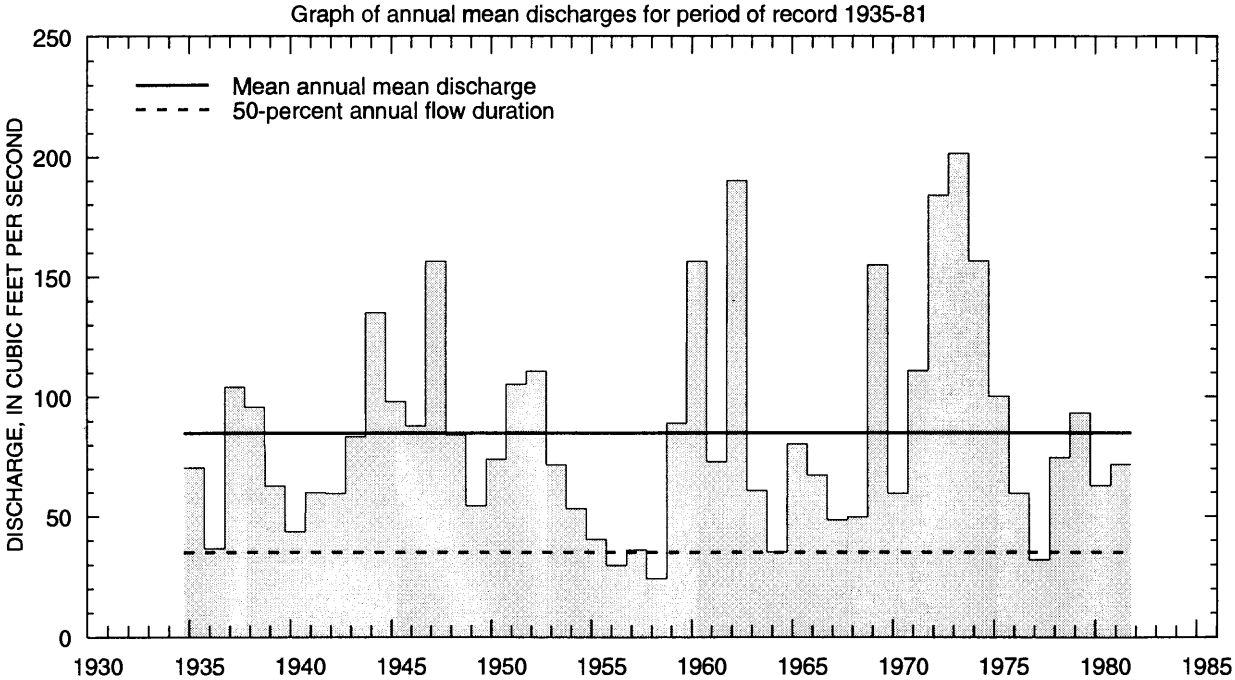
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	24	13.0	4,770
4.0	153	15.0	6,920
5.0	375	17.0	9,800
6.0	660	19.0	13,700
7.0	1,020	21.0	20,000
9.0	1,950	23.0	37,900
11.0	3,150		

05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1935-81

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	243	1962	9.68	1957	43.3	45.3
November	549	1962	11.7	1956	54.1	80.4
December	176	1973	10.0	1959	39.0	32.0
January	281	1960	8.39	1977	58.2	60.0
February	461	1971	12.1	1959	102	87.6
March	481	1959	17.3	1957	181	115
April	506	1973	24.8	1957	119	93.1
May	503	1960	13.8	1958	107	99.3
June	735	1947	14.3	1977	127	162
July	413	1969	7.24	1936	67.4	71.9
August	626	1972	12.1	1937	63.3	90.5
September	562	1972	8.41	1958	59.8	87.1
Annual	201	1973	24.2	1958	84.9	44.3

Graph of annual mean discharges for period of record 1935-81



05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IOWA—Continued

Monthly and annual flow durations, based on period of record 1935-81

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.0	8.6	8.4	7.6	7.8	14	14	12	10	6.7	6.0	7.2	8.0
95	11	12	10	9.6	11	17	21	17	14	9.8	9.2	9.9	11
90	13	14	12	11	13	22	29	25	18	14	12	12	14
85	14	15	14	12	16	26	35	29	22	16	13	13	16
80	16	17	15	14	18	31	39	33	26	18	15	15	18
75	17	18	16	15	20	36	43	36	28	20	17	16	20
70	18	20	18	18	22	41	47	40	32	22	18	17	23
60	22	26	22	21	26	56	57	47	40	26	21	21	28
50	26	31	26	25	31	69	70	58	48	31	26	26	35
40	30	36	31	30	39	98	87	70	60	37	33	32	44
30	35	43	36	37	50	139	112	86	78	48	43	39	56
25	40	46	40	41	55	168	126	102	90	57	50	43	66
20	47	52	45	49	68	208	148	120	114	68	56	48	81
15	56	61	54	58	97	283	179	153	142	83	67	60	106
10	73	82	66	76	152	410	226	196	198	109	94	88	150
5	122	150	86	145	355	778	329	297	402	199	175	179	265

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 55 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	4,090
0.50	2	6,650
0.20	5	11,100
0.10	10	14,600
0.04	25	19,800
0.02	50	24,200
0.01	100	29,000
0.005	200	34,400

Magnitude and frequency of annual high discharges, based on period of record 1935-81

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	235	149	87	56
0.95	1.05	380	228	137	91
0.90	1.11	487	286	174	117
0.80	1.25	656	376	231	157
0.50	2	1,140	634	398	273
0.20	5	1,930	1,060	678	461
0.10	10	2,520	1,390	894	601
0.04	25	3,330	1,860	1,200	790
0.02	50	3,970	2,230	1,440	940
0.01	100	4,640	2,640	1,710	1,100
0.005	200	5,350	3,070	1,990	1,260

05414500 LITTLE MAQUOKETA RIVER NEAR DURANGO, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1935 to March 1981

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.1	4.2	4.7	4.9	5.6	6.5	8.0	9.1	10
0.02	50	4.6	4.8	5.3	5.6	6.3	7.4	9.0	10	11
0.05	20	5.5	5.8	6.3	6.8	7.7	8.9	11	12	13
0.10	10	6.5	6.9	7.5	8.0	9.2	11	12	14	16
0.20	5	7.9	8.5	9.1	9.9	11	13	15	17	20
0.50	2	12	13	14	15	17	20	23	25	31
0.80	1.25	18	20	21	22	26	32	38	41	53
0.90	1.11	23	25	26	28	32	41	50	55	71
0.96	1.04	29	32	33	35	41	54	67	76	100
0.98	1.02	35	37	39	41	47	64	83	95	126
0.99	1.01	41	43	45	47	54	76	101	117	156

Magnitude and frequency of seasonal low discharges, based on period of record October 1934 to December 1981

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.0	5.5	5.6	6.7	6.6	7.5	8.0	10
0.02	50	5.7	6.3	6.6	7.8	7.7	8.8	9.6	12
0.05	20	7.0	7.8	8.3	9.7	9.8	11	12	16
0.10	10	8.4	9.3	10	12	12	14	16	20
0.20	5	10	12	13	16	16	18	21	27
0.50	2	16	18	20	26	26	29	35	47
0.80	1.25	25	28	31	47	43	49	58	81
0.90	1.11	31	35	38	64	56	63	75	107
0.96	1.04	40	45	48	92	74	83	99	144
0.98	1.02	47	53	56	116	89	100	118	174
0.99	1.01	54	61	63	144	106	118	138	207
		July-August-September				October-November-December			
0.01	100	3.9	4.6	5.2	5.6	4.9	5.9	6.3	7.5
0.02	50	4.7	5.4	5.9	6.6	5.6	6.7	7.1	8.5
0.05	20	6.0	6.8	7.4	8.5	6.8	8.2	8.7	10
0.10	10	7.4	8.3	9.0	11	8.2	9.7	10	12
0.20	5	9.6	11	11	14	10	12	13	15
0.50	2	16	17	18	23	16	19	20	24
0.80	1.25	25	27	30	38	26	30	32	38
0.90	1.11	32	34	39	49	33	38	41	49
0.96	1.04	41	44	53	64	44	50	54	64
0.98	1.02	49	52	64	77	53	61	65	77
0.99	1.01	56	60	76	89	63	72	76	90

05417000 MAQUOKETA RIVER NEAR MANCHESTER, IOWA

LOCATION.—Lat 42°27'22", long 91°25'56", in NW1/4 NE1/4 sec.9, T88N, R5W, Delaware County, Hydrologic Unit 07060006, on left bank 0.6 mi downstream from Sand Creek, 1.5 mi upstream from Spring Branch, 2.3 mi southeast from dam on Maquoketa River in Manchester and at mile 100.5.

DRAINAGE AREA.—305 mi^2.

PERIOD OF RECORD.—April 1933 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Concrete control since June 1, 1935. Datum of gage is 895.06 ft above mean sea level, adjustment of 1912.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,000 ft^3/s, June 13, 1947, gage height, 21.36 ft from rating curve extended above 10,000 ft^3/s by velocity-area method; minimum daily discharge, 6 ft^3/s, June 8 and 29, 1934.

Selected values from rating table number 4, developed April 1964
(A discharge measurement to validate this rating has not been made since October 1973)

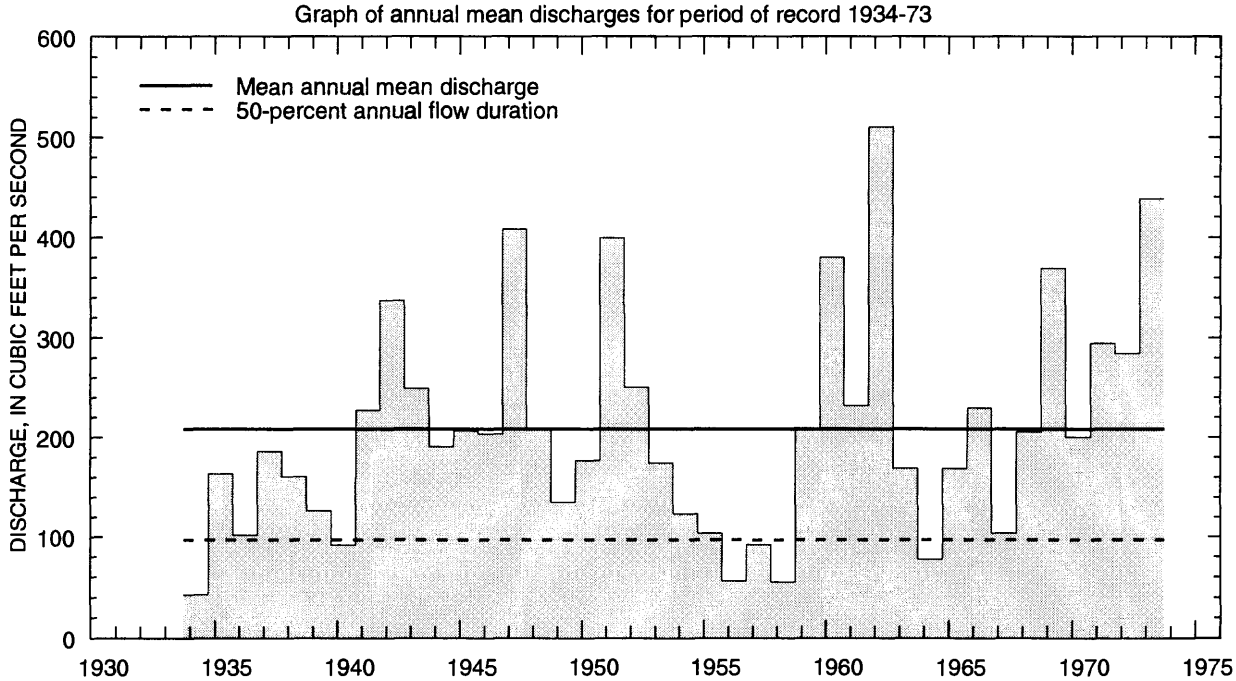
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	35	9.0	2,610
5.0	75	10.0	3,480
5.5	200	12.0	5,550
6.0	420	14.0	8,000
6.5	720	16.0	10,800
7.0	1,060	18.0	14,000
8.0	1,810	20.0	17,500

05417000 MAQUOKETA RIVER NEAR MANCHESTER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1934-73

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	616	1962	31.6	1959	131	142
November	1,032	1962	32.3	1959	158	185
December	320	1973	26.9	1959	106	74.0
January	471	1946	21.0	1959	118	106
February	768	1971	22.8	1959	194	165
March	1,005	1962	41.7	1934	435	286
April	1,041	1951	36.0	1934	299	249
May	1,131	1960	22.7	1934	261	233
June	1,976	1947	11.7	1934	299	322
July	1,087	1969	34.6	1936	216	236
August	707	1968	35.1	1934	138	148
September	603	1941	32.1	1958	147	144
Annual	510	1962	42.7	1934	208	112

Graph of annual mean discharges for period of record 1934-73



05417000 MAQUOKETA RIVER NEAR MANCHESTER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1934-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	25	27	24	21	19	31	27	21	11	27	26	26	23
95	31	34	31	27	27	42	46	37	39	36	30	34	33
90	36	38	35	34	36	50	62	55	55	45	39	38	39
85	40	43	39	36	40	56	80	71	66	52	43	41	44
80	43	47	42	39	44	70	98	82	74	58	46	44	50
75	47	52	45	41	46	87	113	90	84	65	50	47	55
70	52	57	50	45	50	101	124	98	93	70	54	53	62
60	61	68	60	53	62	137	147	118	116	83	64	65	79
50	71	82	72	62	76	180	176	146	144	98	80	80	97
40	85	104	91	79	92	251	216	179	186	120	96	94	125
30	106	144	116	100	125	361	272	224	242	160	116	118	163
25	125	165	135	115	140	435	312	261	285	184	130	133	191
20	165	197	150	134	166	515	358	314	344	222	153	157	229
15	210	243	170	161	217	660	440	384	443	290	180	186	289
10	291	308	195	210	350	946	550	515	606	411	235	246	394
5	392	452	260	290	712	1,680	897	846	972	632	331	385	648

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 53 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,490
0.90	1.11	1,940
0.80	1.25	2,650
0.50	2	4,740
0.20	5	8,300
0.10	10	11,000
0.04	25	14,800
0.02	50	17,900
0.01	100	21,100
0.005	200	24,500

Magnitude and frequency of annual high discharges, based on period of record 1934-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	334	198	126	86
0.95	1.05	670	399	249	175
0.90	1.11	935	558	346	246
0.80	1.25	1,350	808	499	358
0.50	2	2,480	1,480	923	659
0.20	5	4,030	2,400	1,530	1,070
0.10	10	4,970	2,960	1,910	1,310
0.04	25	6,020	3,570	2,340	1,570
0.02	50	6,710	3,970	2,640	1,740
0.01	100	7,320	4,320	2,910	1,890
0.005	200	7,860	4,630	3,160	2,020

05417000 MAQUOKETA RIVER NEAR MANCHESTER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1934 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.6	10	12	13	15	19	22	24	25
0.02	50	10	12	14	15	17	21	24	27	28
0.05	20	13	16	17	19	21	25	28	31	32
0.10	10	16	19	21	23	25	29	33	36	39
0.20	5	21	25	27	29	32	36	40	44	50
0.50	2	33	38	41	44	49	55	62	69	84
0.80	1.25	50	56	61	66	75	86	104	117	150
0.90	1.11	62	68	75	82	94	111	141	160	207
0.96	1.04	76	83	92	101	119	148	201	230	298
0.98	1.02	87	93	105	116	138	179	257	296	380
0.99	1.01	97	104	117	132	159	213	324	374	476

Magnitude and frequency of seasonal low discharges, based on period of record July 1933 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	16	16	17	20	7.9	13	15	16
0.02	50	17	18	19	22	11	17	19	21
0.05	20	20	21	22	27	16	25	27	32
0.10	10	23	25	27	32	22	34	37	46
0.20	5	27	31	33	39	33	48	52	67
0.50	2	39	47	50	62	64	87	95	128
0.80	1.25	59	73	79	103	111	143	162	218
0.90	1.11	75	93	102	138	142	179	209	275
0.96	1.04	98	122	134	191	180	222	267	343
0.98	1.02	117	146	161	238	207	252	310	389
0.99	1.01	139	172	190	292	232	280	352	432
		July-August-September				October-November-December			
0.01	100	14	20	21	23	13	21	23	23
0.02	50	15	22	23	25	14	23	25	25
0.05	20	19	26	27	30	17	26	28	30
0.10	10	22	30	32	35	20	30	32	35
0.20	5	27	36	39	43	25	36	39	43
0.50	2	41	53	57	66	41	54	58	66
0.80	1.25	62	79	88	106	71	89	95	112
0.90	1.11	79	98	111	137	99	119	128	151
0.96	1.04	101	125	146	185	144	169	180	214
0.98	1.02	119	147	174	225	186	214	229	272
0.99	1.01	138	170	205	271	237	269	286	341

05417700 BEAR CREEK NEAR MONMOUTH, IOWA

LOCATION.—Lat 42°02'18", long 90°52'59", in NE1/4 SE1/4 sec.31, T84N, R1E, Jackson County, Hydrologic Unit 07060006, on right bank 15 ft downstream from bridge on county highway, 1.6 mi upstream from Rat Run, 2.8 mi south of Monmouth and 8.2 mi upstream from mouth.

DRAINAGE AREA.—61.3 mi^2.

PERIOD OF RECORD.—October 1957 to September 1976 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 728.80 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 7,340 ft^3/s, September 21, 1965, gage height, 13.76 ft; minimum daily discharge, 1.8 ft^3/s, December 8-12, 1958.

Selected values from rating table number 6, developed March 1976
(A discharge measurement to validate this rating has not been made since October 1976)

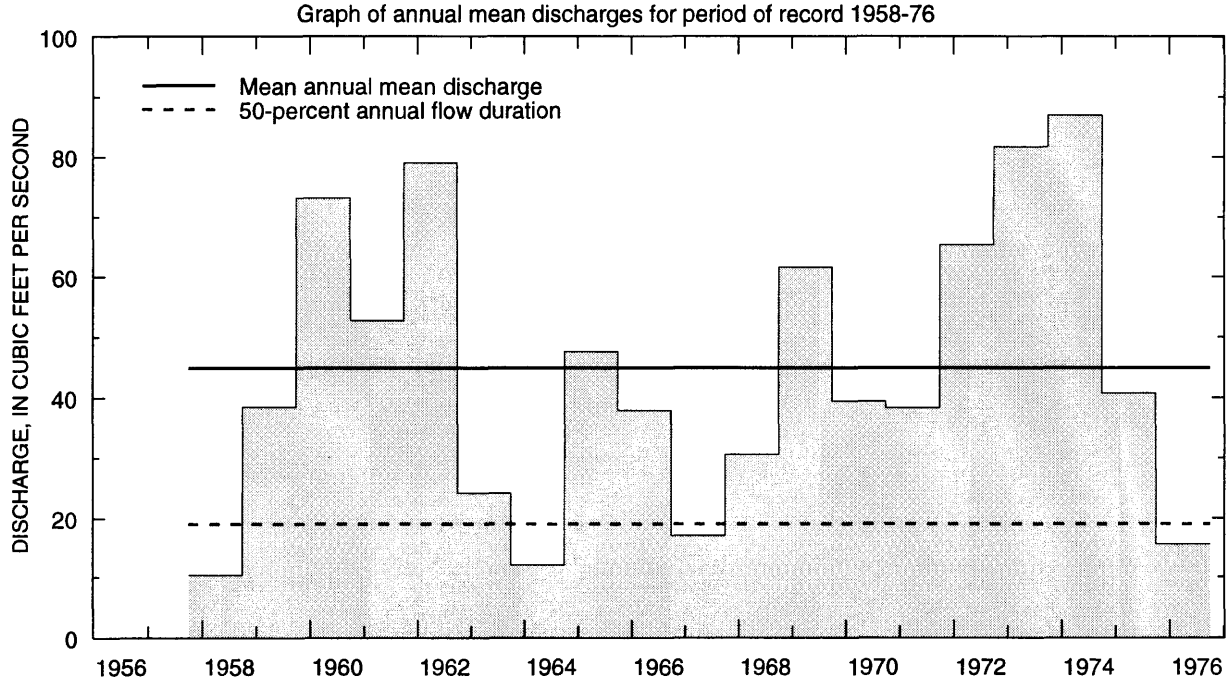
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	5.5	9.0	1,350
5.5	38	10.0	1,900
6.0	146	11.0	2,640
6.5	308	12.0	3,640
7.0	500	13.0	5,020
8.0	900		

05417700 BEAR CREEK NEAR MONMOUTH, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1958-76

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	66.7	1962	3.51	1958	22.2	17.2
November	206	1962	3.99	1959	34.6	45.9
December	78.6	1972	2.35	1959	24.8	21.6
January	130	1960	2.52	1959	32.2	33.9
February	201	1971	5.79	1964	44.3	43.0
March	214	1962	11.3	1958	88.3	57.7
April	216	1973	17.3	1958	61.0	51.4
May	254	1974	7.94	1958	60.4	64.7
June	236	1974	7.67	1963	66.7	59.6
July	196	1969	5.74	1958	43.3	43.9
August	149	1972	3.75	1976	25.7	32.2
September	263	1965	2.76	1958	35.9	59.3
Annual	87.0	1974	10.3	1958	44.9	24.2

Graph of annual mean discharges for period of record 1958-76



05417700 BEAR CREEK NEAR MONMOUTH, IOWA—Continued

Monthly and annual flow durations, based on period of record 1958-76

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	2.2	2.7	1.9	2.1	2.2	7.9	9.8	4.9	5.7	3.8	3.1	2.2	2.4
95	2.8	3.5	2.8	2.7	2.7	9.3	13	8.1	7.1	5.2	3.6	3.1	3.7
90	3.7	4.6	3.6	3.6	5.3	12	15	11	9.0	5.8	4.9	3.8	5.3
85	4.7	5.3	4.6	4.5	6.2	15	17	13	9.6	6.6	6.5	4.8	6.7
80	5.2	6.2	6.0	5.2	7.0	17	18	14	11	7.9	7.2	5.8	8.3
75	6.5	8.9	7.4	6.0	9.0	19	20	16	13	9.6	7.9	6.6	10
70	7.6	11	9.2	7.0	10	21	22	17	15	11	9.3	7.4	12
60	13	15	12	9.8	13	25	27	20	21	15	11	10	15
50	16	17	15	12	17	31	34	26	29	18	13	14	19
40	20	20	19	18	22	49	44	34	39	24	17	15	24
30	24	25	24	27	27	68	58	48	57	34	21	18	33
25	27	34	27	30	32	85	64	60	70	42	23	22	40
20	31	42	31	35	37	106	77	73	83	50	27	32	50
15	39	56	37	44	48	135	98	92	104	62	33	40	63
10	49	72	44	60	81	207	125	126	130	87	41	55	89
5	62	110	64	100	155	361	205	202	223	126	68	94	148

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 19 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	270
0.95	1.05	487
0.90	1.11	655
0.80	1.25	925
0.50	2	1,710
0.20	5	2,960
0.10	10	3,870
0.04	25	5,050
0.02	50	5,940
0.01	100	6,840
0.005	200	7,740

Magnitude and frequency of annual high discharges, based on period of record 1958-76

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	77	40	26	15
0.95	1.05	144	78	52	33
0.90	1.11	198	110	72	48
0.80	1.25	286	161	105	73
0.50	2	550	315	201	146
0.20	5	992	567	347	256
0.10	10	1,320	747	443	326
0.04	25	1,750	978	561	407
0.02	50	2,090	1,150	645	461
0.01	100	2,430	1,320	723	511
0.005	200	2,770	1,490	797	555

05417700 BEAR CREEK NEAR MONMOUTH, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1976

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.4	1.5	1.6	1.7	1.9	2.0	2.0	2.1
0.02	50	1.5	1.6	1.8	1.9	2.0	2.3	2.5	2.6	2.8
0.05	20	1.9	2.0	2.2	2.4	2.7	3.2	3.5	3.6	4.3
0.10	10	2.3	2.4	2.8	3.0	3.5	4.2	4.7	5.0	6.2
0.20	5	2.9	3.1	3.6	4.0	4.7	5.8	6.6	7.3	9.3
0.50	2	4.8	5.1	6.0	6.5	8.1	10	12	14	19
0.80	1.25	8.2	8.8	9.8	11	13	18	22	26	36
0.90	1.11	11	12	13	14	17	23	29	35	48
0.96	1.04	15	17	17	18	22	30	38	47	64
0.98	1.02	19	19	20	22	25	36	45	56	77
0.99	1.01	23	23	24	25	29	41	52	66	89

Magnitude and frequency of seasonal low discharges, based on period of record October 1957 to September 1976

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.1	1.3	1.4	1.5	2.6	2.9	3.5	4.7
0.02	50	1.4	1.6	1.7	2.0	3.2	3.5	4.2	5.4
0.05	20	1.8	2.2	2.4	2.9	4.2	4.7	5.3	6.9
0.10	10	2.4	2.9	3.2	4.0	5.3	6.0	6.7	8.6
0.20	5	3.3	4.1	4.7	5.9	7.2	8.2	9.1	12
0.50	2	6.0	7.7	9.1	13	13	15	17	22
0.80	1.25	11	14	17	27	24	29	35	44
0.90	1.11	15	20	23	41	33	41	52	67
0.96	1.04	21	28	31	63	46	60	82	106
0.98	1.02	26	35	38	82	58	77	111	146
0.99	1.01	31	43	45	105	71	96	148	196
		July-August-September				October-November-December			
0.01	100	1.6	1.8	1.9	2.2	1.0	1.0	1.1	1.4
0.02	50	1.9	2.2	2.2	2.6	1.4	1.4	1.5	1.8
0.05	20	2.5	2.9	3.0	3.4	2.0	2.1	2.3	2.8
0.10	10	3.1	3.6	3.8	4.4	2.8	3.0	3.3	3.9
0.20	5	4.1	4.7	4.9	5.8	4.0	4.5	5.0	5.8
0.50	2	6.8	7.6	8.1	10	7.7	9.2	10	12
0.80	1.25	11	12	13	17	14	17	19	22
0.90	1.11	14	15	16	22	18	23	25	30
0.96	1.04	18	19	20	28	23	32	33	41
0.98	1.02	22	22	23	34	27	38	39	49
0.99	1.01	25	25	26	39	32	45	46	58

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IOWA

LOCATION.—Lat 42°08'48", long 90°40'33", in SW1/4 NE1/4 sec. 25, T85N, R2E, Jackson County, Hydrologic Unit 07060006, on right downstream bank at bridge on State Highway 61, 7.8 mi upstream from mouth, and 5.5 mi north of junction of State Highway 64 and 61 and 0.5 mi south of Fulton.

DRAINAGE AREA.—516 mi^2.

PERIOD OF RECORD.—July 1977 to September 1991 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 666.19 ft above sea level. Nonrecording gage July 7 to September 22, 1977.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,700 ft^3/s, August 31, 1981, gage height, 17.26 ft; minimum daily discharge, 46 ft^3/s, December 24, 25, 1989.

Selected values from rating table number 3, developed March 1985
(A discharge measurement to validate this rating has not been made since October 1991)

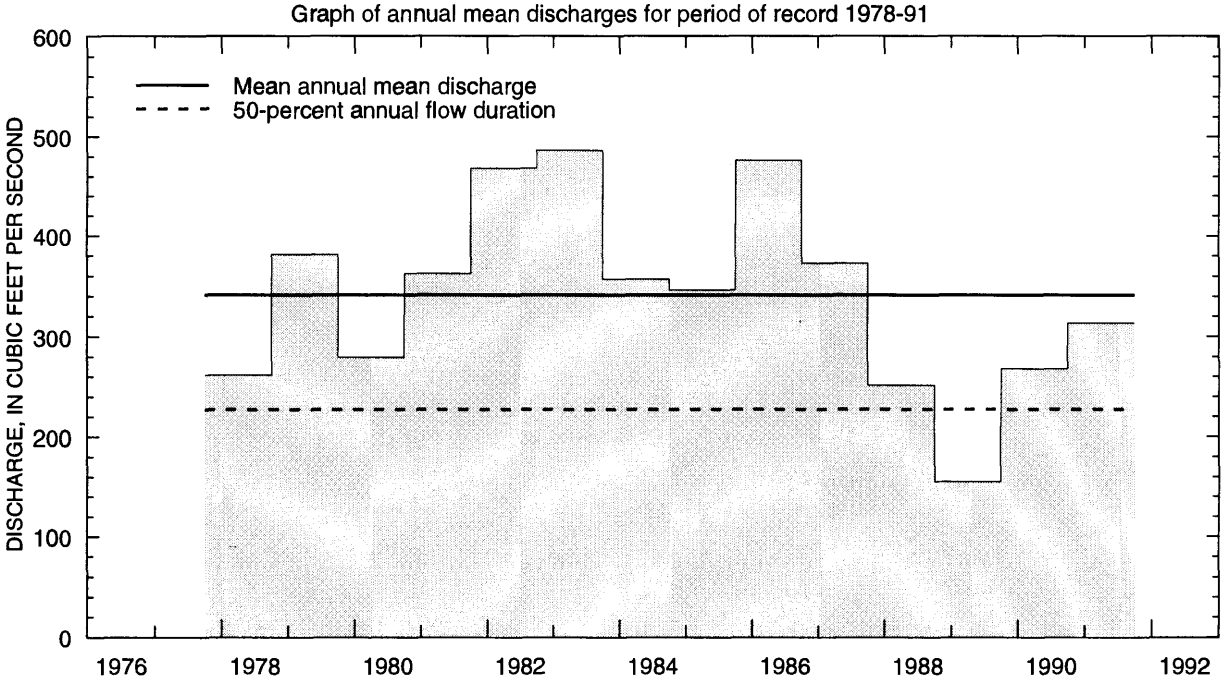
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	62	9.0	3,270
4.0	340	10.0	4,080
5.0	748	12.0	5,870
6.0	1,260	14.0	7,880
7.0	1,850	16.0	10,100
8.0	2,530	18.0	12,500

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1978-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	867	1987	105	1990	263	198
November	528	1983	110	1990	268	133
December	762	1983	79.1	1990	262	175
January	350	1980	92.8	1991	203	77.7
February	891	1985	123	1978	337	218
March	1,250	1982	214	1981	606	386
April	752	1983	139	1990	408	187
May	615	1978	139	1989	362	148
June	891	1984	147	1989	425	215
July	941	1983	110	1989	325	229
August	863	1990	116	1989	336	245
September	917	1986	136	1989	301	236
Annual	486	1983	155	1989	341	95.3

Graph of annual mean discharges for period of record 1978-91



05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1978-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	101	105	50	69	72	91	116	132	109	99	96	103	78
95	104	114	83	85	83	116	132	137	149	110	114	116	105
90	121	133	101	96	98	152	146	154	163	134	133	129	127
85	137	139	110	105	109	175	188	170	172	147	141	134	138
80	146	147	127	119	118	191	241	187	189	154	145	144	149
75	154	160	135	125	130	215	261	208	208	170	151	158	160
70	164	172	149	136	140	246	280	242	225	180	159	169	173
60	185	185	169	150	166	278	323	277	260	196	183	187	199
50	195	204	200	162	190	350	366	331	298	212	216	204	227
40	204	245	240	190	220	405	402	358	355	242	232	222	268
30	218	300	282	210	250	480	457	398	400	294	268	248	328
25	229	318	320	230	280	562	485	434	446	320	291	271	363
20	258	350	360	240	350	689	525	471	489	352	329	289	403
15	366	408	407	264	421	839	577	518	561	394	384	339	467
10	532	460	486	288	620	1,310	669	576	734	449	551	450	570
5	765	540	632	362	1,040	2,180	863	722	1,080	758	846	687	816

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 15 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	3,020
0.80	1.25	4,000
0.50	2	6,450
0.20	5	9,610
0.10	10	11,500
0.04	25	13,700
0.02	50	15,100
0.01	100	16,400
0.005	200	17,600

Magnitude and frequency of annual high discharges, based on period of record 1978-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	570	434	314	242
0.95	1.05	1,060	753	520	394
0.90	1.11	1,420	977	661	494
0.80	1.25	1,940	1,300	864	634
0.50	2	3,220	2,060	1,340	941
0.20	5	4,720	2,930	1,890	1,270
0.10	10	5,510	3,400	2,200	1,430
0.04	25	6,320	3,880	2,520	1,590
0.02	50	6,790	4,160	2,720	1,690
0.01	100	7,180	4,400	2,890	1,760
0.005	200	7,510	4,610	3,040	1,820

05418450 NORTH FORK MAQUOKETA RIVER AT FULTON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1978 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	34	34	36	38	50	68	74	74	83
0.02	50	40	41	43	45	58	76	83	83	93
0.05	20	50	52	54	57	71	88	97	99	111
0.10	10	61	63	66	70	84	101	111	115	129
0.20	5	76	79	82	87	101	118	131	138	155
0.50	2	109	113	119	125	140	157	177	192	220
0.80	1.25	149	151	159	168	182	205	235	263	314
0.90	1.11	171	171	181	191	206	233	271	309	378
0.96	1.04	192	192	203	214	231	267	313	365	462
0.98	1.02	205	205	217	229	247	290	342	405	525
0.99	1.01	216	216	229	241	261	312	371	445	590

Magnitude and frequency of seasonal low discharges, based on period of record July 1977 to September 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	43	51	53	73	81	90	90	93
0.02	50	48	57	59	80	90	99	100	105
0.05	20	56	66	69	90	104	114	118	125
0.10	10	65	76	79	101	119	130	136	146
0.20	5	78	90	94	116	140	152	162	176
0.50	2	109	123	130	154	193	207	224	247
0.80	1.25	151	170	181	207	267	282	309	340
0.90	1.11	179	201	216	244	317	332	364	399
0.96	1.04	215	241	261	291	382	397	434	470
0.98	1.02	242	271	295	328	431	445	485	522
0.99	1.01	269	301	330	365	481	494	536	572
		July-August-September				October-November-December			
0.01	100	58	63	67	97	36	39	41	65
0.02	50	66	71	75	104	42	47	50	74
0.05	20	80	84	89	116	52	62	67	90
0.10	10	93	98	103	128	64	77	84	106
0.20	5	111	116	122	144	80	98	109	129
0.50	2	149	156	165	182	120	147	163	183
0.80	1.25	192	202	215	233	176	203	220	256
0.90	1.11	215	229	244	266	211	234	248	302
0.96	1.04	240	259	278	308	255	266	276	358
0.98	1.02	256	279	300	339	285	286	292	399
0.99	1.01	270	297	321	369	303	304	305	438

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IOWA

LOCATION.—Lat 42°05'00", long 90°37'58", in SW1/4 NE1/4 sec. 17, T84N, R3E, Jackson County, Hydrologic Unit 07060006, on right downstream bank at State Highway 62 bridge, 900 ft. upstream from Prairie Creek, 2.0 mi northeast of Maquoketa, 2.2 mi downstream from North Fork, and 26.7 mi upstream from mouth.

DRAINAGE AREA.—1,553 mi^2.

PERIOD OF RECORD.—September 1913 to September 1996. Prior to October 1939, published as "below North Fork near Maquoketa." Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 625.96 ft above sea level. Prior to July 14, 1924, nonrecording gage, and July 15, 1924 to Sept. 30, 1972, recording gage at site 300 ft upstream from State Highway 62 bridge at datum 10.00 ft higher. Gage moved to current location August 3, 1995.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 48,000 ft^3/s, June 27, 1944, gage height, 24.70 ft; minimum daily discharge, 105 ft^3/s, February 11, 1936.

Selected values from rating table number 9, developed October 1977

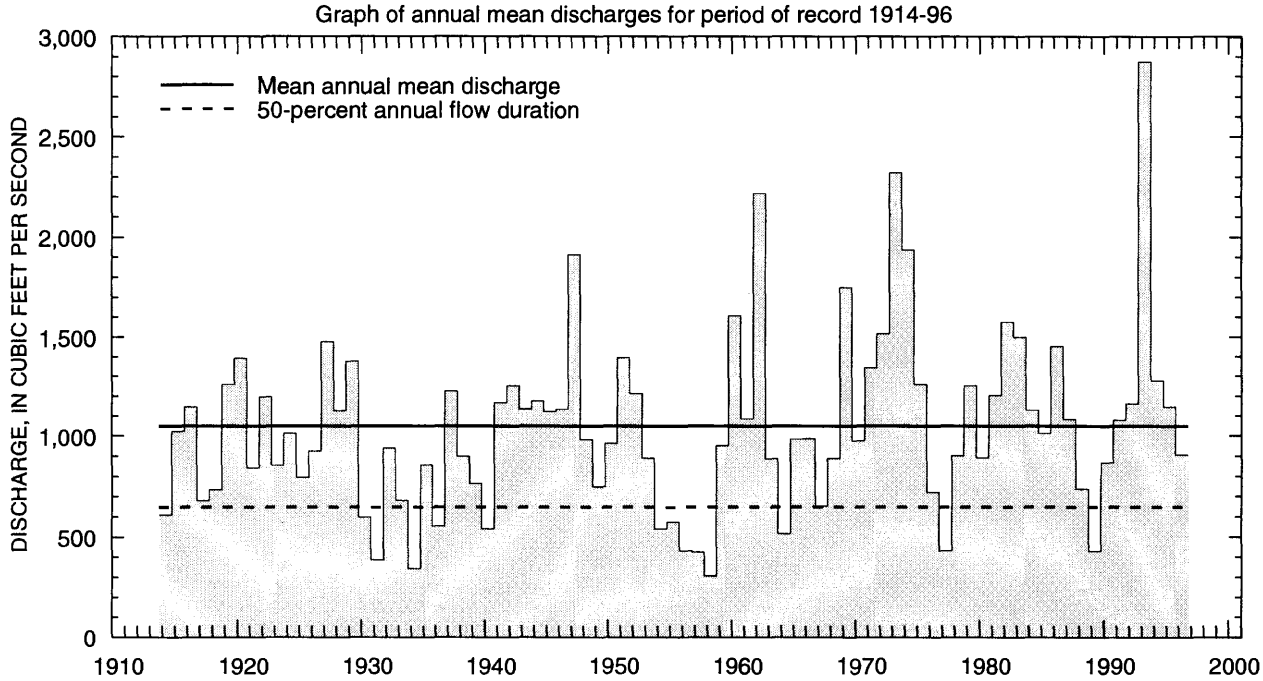
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
10.0	184	20.0	7,010
12.0	920	24.0	12,100
14.0	2,000	28.0	21,000
16.0	3,400	32.0	35,500
18.0	5,150	35.0	49,500

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1914-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,486	1987	210	1957	724	497
November	4,983	1962	198	1959	791	662
December	2,397	1983	177	1959	662	427
January	2,851	1960	150	1940	696	530
February	4,161	1971	196	1936	1,089	726
March	4,798	1993	241	1934	1,869	1,193
April	4,843	1973	305	1934	1,342	872
May	4,267	1974	198	1934	1,222	847
June	6,670	1947	170	1934	1,429	1,047
July	8,835	1993	177	1936	1,058	1,104
August	3,340	1924	227	1958	830	622
September	3,074	1981	182	1958	888	696
Annual	2,874	1993	306	1958	1,049	450

Graph of annual mean discharges for period of record 1914-96



05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1914-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	185	186	150	145	125	242	239	192	189	176	141	177	164
95	250	241	200	190	205	306	368	348	296	274	238	240	240
90	279	278	236	220	270	400	424	415	395	342	292	289	296
85	309	312	270	250	320	476	488	461	458	378	339	316	340
80	336	336	300	292	360	550	551	518	510	417	369	340	380
75	362	362	330	330	380	624	627	562	570	460	401	368	420
70	402	405	360	360	420	713	685	600	630	499	425	397	461
60	470	485	430	420	500	880	830	718	763	577	489	462	550
50	531	580	510	490	600	1,100	984	860	927	675	560	538	648
40	610	663	590	551	722	1,310	1,160	1,020	1,110	802	646	631	787
30	725	783	712	660	890	1,630	1,420	1,220	1,380	978	780	767	976
25	810	870	800	720	992	1,870	1,600	1,400	1,580	1,100	864	854	1,100
20	912	1,020	916	800	1,160	2,200	1,810	1,590	1,850	1,260	972	980	1,270
15	1,110	1,180	1,010	940	1,500	2,930	2,070	1,900	2,180	1,420	1,120	1,200	1,530
10	1,410	1,420	1,200	1,100	2,080	4,050	2,500	2,350	2,730	1,810	1,440	1,560	1,970
5	1,850	1,930	1,510	1,600	3,380	6,430	3,370	3,300	4,140	2,860	2,290	2,450	3,000

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 85 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	3,440
0.95	1.05	5,400
0.90	1.11	6,820
0.80	1.25	8,960
0.50	2	14,700
0.20	5	23,500
0.10	10	29,600
0.04	25	37,600
0.02	50	43,600
0.01	100	49,700
0.005	200	55,900

Magnitude and frequency of annual high discharges, based on period of record 1914-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,990	1,490	1,090	743
0.95	1.05	3,130	2,250	1,600	1,120
0.90	1.11	3,960	2,780	1,960	1,390
0.80	1.25	5,230	3,580	2,490	1,770
0.50	2	8,720	5,700	3,870	2,760
0.20	5	14,200	8,880	5,890	4,140
0.10	10	18,200	11,100	7,290	5,060
0.04	25	23,400	14,000	9,090	6,190
0.02	50	27,500	16,200	10,500	7,020
0.01	100	31,700	18,400	11,800	7,820
0.005	200	36,000	20,700	13,200	8,620

05418500 MAQUOKETA RIVER NEAR MAQUOKETA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1914 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	88	92	94	97	104	126	148	164	182
0.02	50	101	107	110	114	122	146	169	186	208
0.05	20	123	132	137	143	154	180	204	225	255
0.10	10	146	158	166	173	188	216	243	267	306
0.20	5	179	196	206	216	236	267	298	328	381
0.50	2	261	286	303	320	353	398	443	488	577
0.80	1.25	373	403	429	456	506	580	657	725	873
0.90	1.11	447	477	507	540	602	702	806	893	1,080
0.96	1.04	539	565	599	640	715	854	1,000	1,110	1,360
0.98	1.02	606	628	664	710	794	966	1,150	1,290	1,580
0.99	1.01	673	687	725	776	869	1,080	1,310	1,460	1,800

Magnitude and frequency of seasonal low discharges, based on period of record October 1913 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	103	109	112	119	136	165	180	201
0.02	50	120	126	131	141	158	191	206	232
0.05	20	149	158	164	181	198	236	254	287
0.10	10	180	191	200	224	242	285	306	348
0.20	5	223	238	251	289	307	358	384	442
0.50	2	330	358	381	461	483	551	598	702
0.80	1.25	471	522	561	718	753	846	936	1,130
0.90	1.11	560	630	680	898	947	1,060	1,190	1,460
0.96	1.04	667	763	826	1,130	1,210	1,340	1,530	1,920
0.98	1.02	743	860	933	1,310	1,410	1,560	1,810	2,300
0.99	1.01	816	955	1,040	1,490	1,620	1,790	2,100	2,710
		July-August-September				October-November-December			
0.01	100	117	142	149	168	102	115	125	150
0.02	50	133	159	167	188	117	133	144	171
0.05	20	161	189	199	224	144	166	178	208
0.10	10	190	220	232	262	173	200	214	248
0.20	5	233	266	281	318	214	250	266	306
0.50	2	343	383	407	466	316	376	402	458
0.80	1.25	504	558	597	692	460	553	598	681
0.90	1.11	617	681	731	854	555	670	732	838
0.96	1.04	765	845	911	1,070	675	816	904	1,040
0.98	1.02	879	972	1,050	1,250	763	924	1,030	1,200
0.99	1.01	996	1,100	1,200	1,430	851	1,030	1,170	1,360

05420500 MISSISSIPPI RIVER AT CLINTON, IOWA

LOCATION.—Lat 41°46'50", long 90°15'07", in NW1/4 sec. 34, T81N, R6E, Clinton County, Hydrologic Unit 07080101, on right bank at end of Eighth Avenue in Camanche, 5.0 mi upstream from Wapsipinicon River, 6.4 mi downstream from Clinton, 10.6 mi downstream from Lock and Dam 13, and at mile 511.8 upstream from Ohio River.

DRAINAGE AREA.—85,600 mi^2. approximately, at Fulton-Lyons Bridge at Clinton.

PERIOD OF RECORD.—June to August 1873 (fragmentary), October 1873 to September 1996 (October 1932 to September 1939, published as "at Le Claire").

GAGE.—Water-stage recorder. Datum of gage is 562.68 ft above sea level. June 6, 1969 to Sept. 16 1988, water-stage recorder at site 400 ft upstream at same datum. Auxiliary water-stage recorder at Lock and Dam 13 since Oct. 1, 1958. See WSP 1728 for history of changes prior to Oct. 1, 1955.

EXTREMES FOR PERIOD OF RECORD.—Maximum daily discharge, 307,000 ft^3/s, and maximum instantaneous gage height, 24.65 ft, April 28, 1965; minimum daily discharge, 6,500 ft^3/s, December 25, 1933.

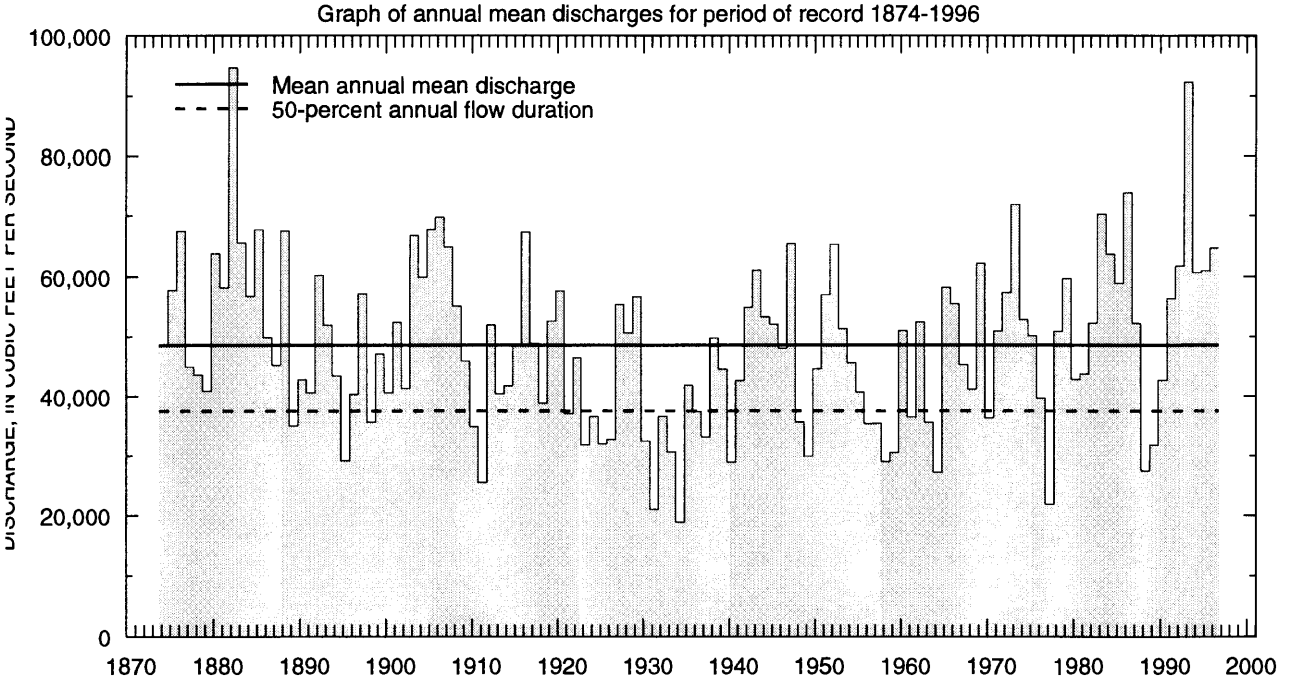
(Rating table not provided because discharge is
a function of both river stage and river slope.)

05420500 MISSISSIPPI RIVER AT CLINTON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1874-1996

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	203,600	1882	13,490	1934	41,160	27,150
November	146,800	1882	13,760	1934	39,160	18,850
December	73,590	1882	11,120	1934	27,710	11,380
January	54,100	1973	11,390	1890	25,560	8,848
February	65,680	1966	14,000	1893	27,670	9,264
March	127,500	1973	17,600	1934	50,450	18,210
April	169,900	1965	26,040	1931	89,150	34,400
May	212,400	1888	23,190	1977	81,730	34,040
June	182,100	1892	15,420	1988	68,370	30,480
July	198,900	1993	14,690	1988	55,490	27,820
August	113,400	1993	12,460	1936	37,750	17,240
September	92,380	1938	13,870	1933	38,070	17,610
Annual	94,690	1882	18,870	1934	48,570	13,770

Graph of annual mean discharges for period of record 1874-1996



05420500 MISSISSIPPI RIVER AT CLINTON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1874-1996

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	14,200	12,800	9,000	11,000	12,000	15,700	24,700	20,400	15,600	15,000	11,700	14,000	12,000
95	17,100	17,400	12,000	14,000	14,500	20,000	34,100	29,300	23,800	18,800	15,800	16,600	16,000
90	19,400	19,200	14,000	15,700	16,000	23,000	40,700	36,500	29,500	22,000	18,400	18,900	18,800
85	21,100	21,500	16,000	17,000	17,500	25,200	46,300	42,000	35,300	25,700	20,600	20,300	20,800
80	22,200	23,800	17,000	18,000	18,500	28,000	52,300	48,100	40,700	29,300	22,800	22,000	22,900
75	24,000	25,400	18,800	19,000	19,200	30,000	58,400	53,300	44,600	32,300	24,900	23,800	24,900
70	25,400	26,700	20,000	19,400	20,000	33,000	63,400	57,400	47,500	36,200	26,700	25,400	26,800
60	28,300	29,600	22,000	21,000	22,000	38,300	75,200	66,000	54,500	41,900	30,000	28,300	31,300
50	32,300	33,300	24,600	23,000	24,600	43,900	85,600	76,400	62,600	48,700	33,300	32,300	37,500
40	37,500	38,100	27,000	25,000	27,000	51,100	94,500	87,000	70,200	57,800	37,200	36,400	45,100
30	44,100	44,100	30,600	29,000	30,000	59,300	103K	96,800	81,800	67,100	42,900	41,900	56,200
25	48,700	48,000	32,900	30,500	32,600	64,600	110K	104K	87,200	72,500	45,200	45,400	62,900
20	54,900	52,300	35,300	33,000	35,000	69,800	119K	112K	93,500	77,600	49,900	51,100	70,500
15	61,000	59,200	40,200	35,500	38,000	75,800	130K	121K	100K	84,700	55,400	58,000	81,100
10	71,200	66,200	46,500	39,000	41,900	85,600	144K	133K	113K	93,600	63,800	65,700	94,100
5	92,500	77,600	56,300	45,400	51,000	102K	165K	152K	133K	111K	74,900	77,600	116K

Magnitude and frequency of instantaneous peak discharges based on period of peak-flow record 1874–1975[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	51,000
0.95	1.05	69,000
0.90	1.11	80,000
0.80	1.25	95,000
0.50	2	130,000
0.20	5	177,000
0.10	10	205,000
0.04	25	242,000
0.02	50	271,000
0.01	100	295,000
0.005	200	321,000

Magnitude and frequency of annual high discharges, based on period of record 1874-1996

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	50,000	47,500	44,200	40,300
0.95	1.05	69,200	66,100	61,500	55,500
0.90	1.11	81,400	77,900	72,500	65,200
0.80	1.25	98,000	94,100	87,600	78,400
0.50	2	135,000	131,000	122,000	108,000
0.20	5	180,000	175,000	163,000	144,000
0.10	10	205,000	201,000	188,000	165,000
0.04	25	234,000	230,000	215,000	189,000
0.02	50	253,000	249,000	234,000	204,000
0.01	100	271,000	267,000	251,000	219,000
0.005	200	287,000	284,000	267,000	233,000

[a] *Upper Mississippi River Water Surface Profiles, River Mile 0.0 to River Mile 847.5, Part I Flow Frequency Estimates Mississippi River Mile 202-840*, Technical Flood Plain Management Task Force of the Upper Mississippi River Basin Commission, 1979. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

05420500 MISSISSIPPI RIVER AT CLINTON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1874 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,330	6,470	7,020	8,510	10,200	11,200	12,000	12,900	13,800
0.02	50	7,050	7,190	7,740	9,230	11,000	12,000	12,900	13,900	14,900
0.05	20	8,260	8,410	8,960	10,400	12,300	13,400	14,400	15,600	16,900
0.10	10	9,460	9,630	10,200	11,600	13,600	14,900	16,000	17,300	18,900
0.20	5	11,100	11,300	11,900	13,300	15,400	16,900	18,100	19,700	21,800
0.50	2	14,900	15,200	15,800	17,300	19,800	21,800	23,400	25,600	29,200
0.80	1.25	19,500	20,000	20,900	22,600	25,600	28,400	30,700	33,700	39,900
0.90	1.11	22,300	23,000	24,100	26,100	29,400	32,800	35,600	39,200	47,400
0.96	1.04	25,600	26,500	28,100	30,400	34,100	38,500	41,900	46,300	57,400
0.98	1.02	27,900	29,000	30,900	33,600	37,600	42,700	46,700	51,700	65,300
0.99	1.01	30,000	31,400	33,600	36,900	41,200	47,000	51,600	57,200	73,400

Magnitude and frequency of seasonal low discharges, based on period of record October 1873 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7,540	8,460	9,930	11,100	12,700	14,300	15,400	17,100
0.02	50	8,510	9,400	10,800	12,000	14,600	16,400	17,600	19,800
0.05	20	10,100	11,000	12,300	13,500	17,900	19,900	21,500	24,500
0.10	10	11,700	12,500	13,700	15,000	21,300	23,600	25,500	29,300
0.20	5	13,800	14,600	15,600	17,100	26,200	28,900	31,200	36,200
0.50	2	18,400	19,200	20,100	21,900	38,300	41,700	45,300	53,000
0.80	1.25	23,500	24,700	25,800	28,200	54,900	59,000	64,200	75,200
0.90	1.11	26,400	27,900	29,400	32,200	65,600	70,000	76,500	89,200
0.96	1.04	29,500	31,500	33,600	37,200	78,900	83,600	91,500	106,000
0.98	1.02	31,500	34,000	36,700	40,800	88,600	93,500	102,000	118,000
0.99	1.01	33,300	36,300	39,600	44,400	98,200	103,000	113,000	130,000
		July-August-September				October-November-December			
0.01	100	9,830	10,700	11,300	12,100	6,880	7,620	9,080	11,500
0.02	50	10,900	11,700	12,400	13,300	7,590	8,340	9,840	12,300
0.05	20	12,600	13,500	14,300	15,300	8,800	9,580	11,100	13,900
0.10	10	14,400	15,400	16,200	17,500	10,000	10,900	12,500	15,400
0.20	5	16,900	18,000	18,900	20,500	11,800	12,700	14,500	17,700
0.50	2	22,900	24,300	25,600	28,100	16,000	17,400	19,500	23,500
0.80	1.25	31,100	33,000	34,900	38,800	21,900	24,200	27,000	32,200
0.90	1.11	36,500	38,800	41,100	46,000	25,800	29,000	32,300	38,400
0.96	1.04	43,300	46,100	49,200	55,400	30,800	35,300	39,500	46,800
0.98	1.02	48,300	51,500	55,300	62,600	34,500	40,200	45,100	53,400
0.99	1.01	53,300	57,000	61,500	69,900	38,200	45,300	51,000	60,300

05420560 WAPSIPINICON RIVER NEAR ELMA, IOWA

LOCATION.—Lat 43°14'34", long 92°31'48", in NW1/4 NW 1/4 sec. 8, T97N, R14W, Howard County, Hydrologic Unit 07080102, on right bank 10 ft downstream from bridge on County Highway B17, 0.2 mi downstream from small left-bank tributary, 4.8 mi west of Elma and at mile 217.9.

DRAINAGE AREA.—95.2 mi^2.

PERIOD OF RECORD.—October 1958 to September 1992 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,130.05 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,100 ft^3/s, June 4, 1974, gage height, 14.94 ft from high-water mark in well; maximum gage height, 15.38 ft from high-water mark in well, probably occurred August 22, 1979; minimum daily discharge, 1.9 ft^3/s, February 4-8, 1959.

Selected values from rating table number 7, developed October 1985
(A discharge measurement to validate this rating has not been made since November 1992)

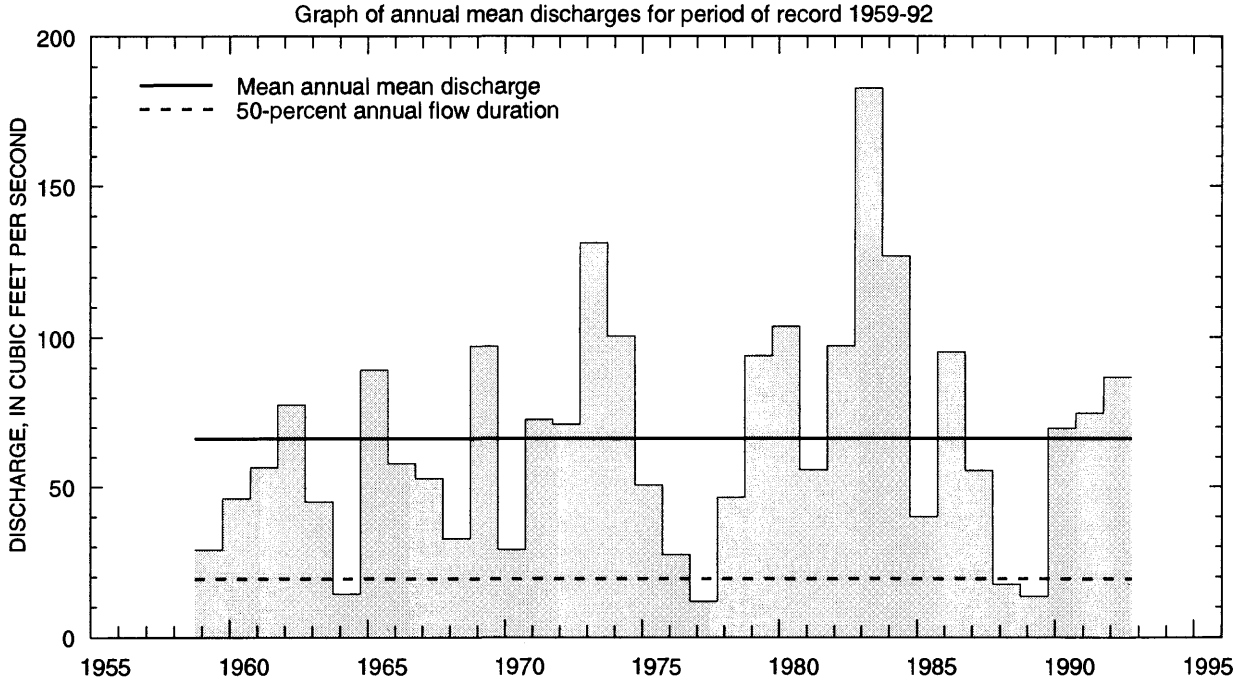
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	2.9	9.0	416
4.0	10.8	11.0	680
5.0	55.1	13.0	1,990
6.0	122	15.0	6,000
7.0	206	15.1	6,310
8.0	304		

05420560 WAPSIPINICON RIVER NEAR ELMA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-92

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	373	1987	5.97	1959	57.2	80.2
November	300	1983	5.83	1959	48.9	66.0
December	190	1983	4.16	1959	27.0	35.0
January	54.0	1983	2.55	1959	14.5	11.8
February	236	1984	1.99	1959	28.1	43.6
March	438	1982	12.4	1964	153	108
April	493	1965	16.4	1989	125	103
May	319	1991	12.4	1959	81.5	74.6
June	550	1984	6.90	1989	93.5	127
July	131	1969	5.43	1964	42.8	34.1
August	412	1990	5.69	1964	55.4	101
September	370	1965	5.06	1988	66.3	95.1
Annual	183	1983	11.8	1977	66.2	38.0

Graph of annual mean discharges for period of record 1959-92



05420560 WAPSIPINICON RIVER NEAR ELMA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-92

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	5.2	5.0	3.6	2.3	2.0	2.9	7.0	8.5	5.6	4.6	3.7	3.7	3.3
95	6.0	6.2	4.8	3.3	4.5	6.6	13	10	6.8	5.8	5.3	5.4	5.6
90	6.6	7.4	6.0	4.9	5.2	9.7	20	14	8.0	6.8	6.2	6.2	6.8
85	7.5	8.2	7.0	5.8	6.7	11	27	18	9.6	7.9	6.8	6.6	8.0
80	8.2	8.9	8.2	6.4	7.1	13	31	21	11	9.1	7.6	7.9	8.9
75	9.4	9.8	9.0	7.2	8.0	17	36	23	13	10	8.5	8.7	10
70	10	12	10	8.2	8.4	23	42	25	15	12	9.1	9.5	11
60	13	15	12	9.0	9.6	41	53	32	22	15	11	12	14
50	17	21	16	11	11	54	66	39	29	19	13	15	19
40	24	26	18	12	13	90	82	51	38	24	15	20	27
30	38	35	21	14	16	128	106	67	51	32	19	29	40
25	51	45	24	16	18	150	124	80	61	37	22	36	51
20	64	61	28	17	22	198	149	94	74	43	26	49	65
15	86	79	37	19	27	254	185	124	98	56	35	63	89
10	119	102	48	25	35	359	242	180	152	78	66	93	130
5	211	153	76	39	80	621	374	271	304	142	168	178	235

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	323
0.90	1.11	506
0.80	1.25	850
0.50	2	2,120
0.20	5	4,800
0.10	10	7,070
0.04	25	10,400
0.02	50	13,200
0.01	100	16,100
0.005	200	19,200

Magnitude and frequency of annual high discharges, based on period of record 1959-92

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	44	39	30	24
0.95	1.05	139	106	73	56
0.90	1.11	238	168	112	83
0.80	1.25	426	280	180	129
0.50	2	1,050	627	381	256
0.20	5	2,030	1,150	679	427
0.10	10	2,630	1,460	862	525
0.04	25	3,270	1,810	1,060	627
0.02	50	3,650	2,020	1,190	688
0.01	100	3,970	2,200	1,310	739
0.005	200	4,240	2,360	1,400	782

05420560 WAPSIPINICON RIVER NEAR ELMA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1992

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.9	2.1	2.2	2.3	2.7	3.3	4.0	4.2	5.0
0.02	50	2.2	2.5	2.6	2.7	3.0	3.8	4.4	4.7	5.5
0.05	20	2.8	3.1	3.2	3.4	3.7	4.6	5.2	5.6	6.0
0.10	10	3.4	3.7	3.8	4.1	4.5	5.4	6.2	6.7	7.0
0.20	5	4.3	4.6	4.8	5.0	5.5	6.8	7.7	8.5	10
0.50	2	6.4	6.6	6.9	7.4	8.3	10	12	14	20
0.80	1.25	9.0	9.2	9.7	11	12	16	21	26	45
0.90	1.11	11	11	11	13	15	21	30	36	70
0.96	1.04	12	13	13	15	19	27	43	54	113
0.98	1.02	13	14	15	17	22	32	55	71	156
0.99	1.01	15	15	16	19	25	37	70	92	211

Magnitude and frequency of seasonal low discharges, based on period of record October 1958 to September 1992

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.9	2.0	2.1	2.3	3.2	3.4	3.5	4.4
0.02	50	2.3	2.4	2.5	2.7	3.8	4.1	4.2	5.5
0.05	20	3.0	3.1	3.2	3.5	4.9	5.3	5.7	7.6
0.10	10	3.7	3.9	4.0	4.4	6.2	6.8	7.5	10
0.20	5	4.8	5.0	5.2	5.7	8.2	9.1	10	14
0.50	2	7.6	8.1	8.5	9.5	14	16	19	27
0.80	1.25	12	12	14	16	24	28	35	50
0.90	1.11	14	15	17	20	32	38	49	70
0.96	1.04	18	19	22	26	43	52	69	98
0.98	1.02	21	22	25	31	53	63	86	122
0.99	1.01	23	24	29	37	63	76	105	148
		July-August-September				October-November-December			
0.01	100	2.0	2.5	2.8	3.3	2.6	3.2	3.4	3.8
0.02	50	2.4	2.9	3.2	3.7	2.9	3.6	3.8	4.3
0.05	20	3.2	3.7	3.9	4.5	3.5	4.2	4.5	5.1
0.10	10	3.9	4.4	4.8	5.4	4.2	4.9	5.4	6.1
0.20	5	5.1	5.6	6.0	6.7	5.3	6.1	6.8	7.7
0.50	2	7.9	8.6	9.4	11	8.9	9.9	11	13
0.80	1.25	12	13	15	19	16	18	20	26
0.90	1.11	14	16	19	27	23	25	29	38
0.96	1.04	17	20	24	39	35	38	43	59
0.98	1.02	19	23	28	50	46	50	56	81
0.99	1.01	21	26	33	63	59	66	73	109

05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IOWA

LOCATION.—Lat 42°27'49", long 91°53'42", in SE1/4 sec. 4, T88N, R9W, Buchanan County, Hydrologic Unit 07080102, on right bank at Sixth Street in Independence, 1,800 ft downstream from dam at abandoned hydroelectric plant, 4.9 mi downstream from Otter Creek, 9.7 mi upstream from Pine Creek, and at mile 142.5.

DRAINAGE AREA.—1,048 mi^2.

PERIOD OF RECORD.—July 1933 to September 1996.

GAGE.—Water-stage recorder and concrete control. Datum of gage is 882.85 ft above sea level. Prior to May 24, 1941 nonrecording gage in tailrace of powerplant 1,800 ft upstream at datum 80.00 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 26,800 ft^3/s, July 18, 1968, gage height, 21.11 ft; minimum daily discharge, 7.0 ft^3/s, many days in 1933 and 1934 when powerplant shut down, January 25–30, 1977.

Selected values from rating table number 10, developed September 1987

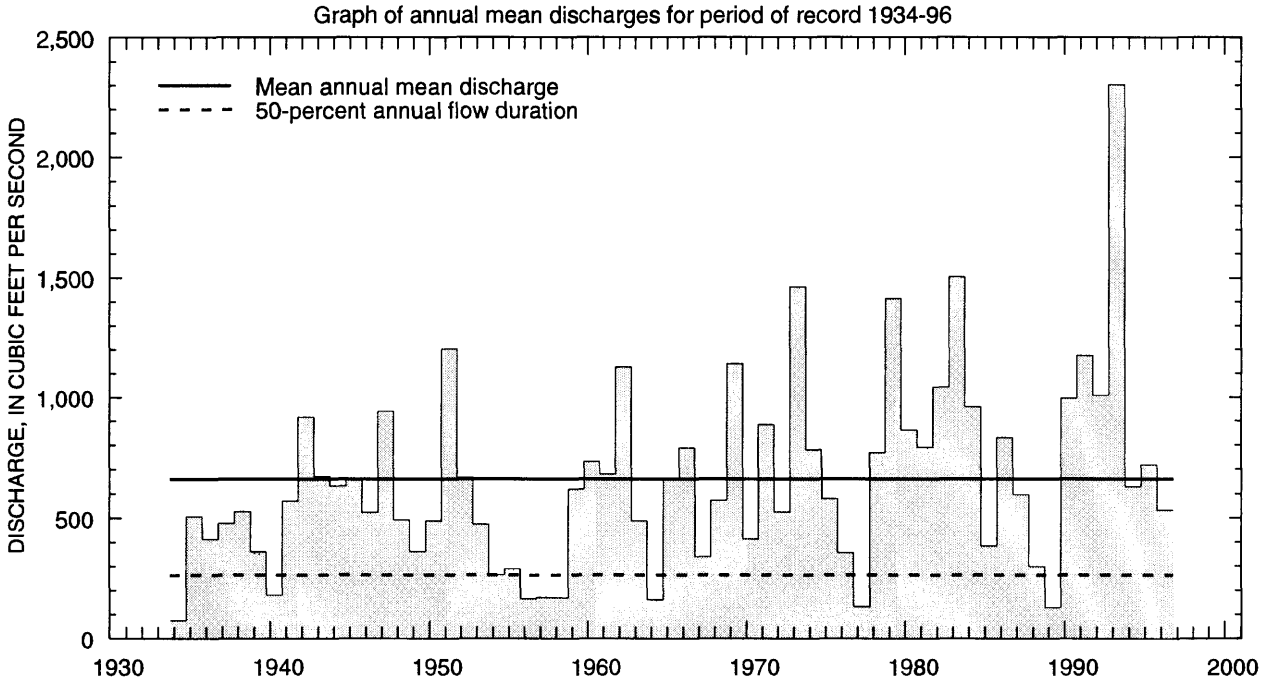
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	29.4	14.0	11,980
5.0	248	16.0	15,460
6.0	1,120	18.0	19,500
8.0	3,650	20.0	23,750
10.0	6,190	21.2	26,400
12.0	8,900		

05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1934-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,306	1973	29.3	1989	383	447
November	2,280	1992	42.2	1977	444	489
December	1,962	1992	26.9	1977	303	351
January	1,411	1946	12.6	1977	226	268
February	1,698	1984	19.0	1956	344	339
March	3,201	1986	68.4	1934	1,427	894
April	5,578	1993	198	1957	1,343	1,120
May	3,860	1991	45.3	1934	901	740
June	4,721	1947	12.4	1934	912	841
July	4,836	1993	18.9	1936	680	922
August	5,443	1993	21.5	1934	556	1,088
September	1,940	1981	20.5	1976	379	436
Annual	2,304	1993	74.5	1934	660	398

Graph of annual mean discharges for period of record 1934-96



05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1934-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	9.0	12	12	9.0	9.0	36	106	36	8.9	9.0	8.0	13	9.0
95	27	35	29	20	23	78	186	98	53	32	21	20	32
90	42	53	42	34	35	120	253	162	98	50	34	36	50
85	53	64	56	45	48	156	328	208	135	74	48	52	66
80	59	82	71	52	57	226	381	250	173	101	64	65	87
75	68	102	88	60	70	303	441	292	209	123	77	75	110
70	79	124	107	76	83	398	485	343	249	143	96	86	131
60	119	165	137	102	112	582	656	439	349	206	123	113	185
50	164	228	182	132	144	814	821	549	487	267	161	143	264
40	239	319	241	166	180	1,130	1,030	695	672	368	205	207	382
30	390	460	309	201	255	1,610	1,310	897	928	514	278	308	569
25	514	527	348	225	310	1,890	1,550	1,050	1,140	640	338	371	704
20	627	653	404	270	398	2,210	1,850	1,290	1,370	780	439	470	880
15	743	815	480	320	528	2,610	2,380	1,540	1,690	1,060	675	621	1,140
10	937	1,010	640	440	820	3,230	3,070	2,110	2,220	1,570	1,050	937	1,610
5	1,300	1,530	930	735	1,430	4,750	4,530	3,030	3,080	2,670	2,140	1,470	2,630

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 63 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	815
0.95	1.05	1,570
0.90	1.11	2,190
0.80	1.25	3,210
0.50	2	6,340
0.20	5	11,700
0.10	10	15,700
0.04	25	21,100
0.02	50	25,300
0.01	100	29,600
0.005	200	34,000

Magnitude and frequency of annual high discharges, based on period of record 1934-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	558	491	383	262
0.95	1.05	1,180	1,010	775	559
0.90	1.11	1,700	1,440	1,090	801
0.80	1.25	2,560	2,140	1,590	1,190
0.50	2	5,170	4,150	3,010	2,240
0.20	5	9,330	7,150	5,060	3,640
0.10	10	12,200	9,110	6,350	4,460
0.04	25	15,700	11,400	7,860	5,330
0.02	50	18,300	13,000	8,880	5,880
0.01	100	20,700	14,500	9,810	6,340
0.005	200	23,000	15,900	10,700	6,740

05421000 WAPSIPINICON RIVER AT INDEPENDENCE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1934 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.5	5.4	6.0	6.9	8.1	12	15	17	19
0.02	50	4.7	7.2	8.1	9.3	11	15	20	23	25
0.05	20	7.2	11	13	14	17	22	29	34	39
0.10	10	10	16	18	20	24	31	40	48	57
0.20	5	16	24	28	30	36	46	60	71	89
0.50	2	37	49	57	62	74	94	121	149	197
0.80	1.25	81	94	106	117	140	179	235	295	417
0.90	1.11	121	128	142	157	189	247	327	414	603
0.96	1.04	170	174	188	210	253	341	457	585	880
0.98	1.02	205	209	222	251	303	417	564	727	1,110
0.99	1.01	240	246	255	292	352	496	678	878	1,370

Magnitude and frequency of seasonal low discharges, based on period of record October 1933 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.9	9.2	10	12	4.7	15	20	24
0.02	50	5.4	12	13	16	7.7	22	29	36
0.05	20	8.9	18	20	24	15	39	48	64
0.10	10	14	26	28	33	27	61	74	103
0.20	5	22	39	41	49	52	101	121	173
0.50	2	54	79	83	103	148	229	274	400
0.80	1.25	123	149	162	212	346	431	545	773
0.90	1.11	185	201	225	306	500	560	741	1,020
0.96	1.04	270	272	315	449	703	709	994	1,310
0.98	1.02	320	326	388	572	800	806	1,180	1,510
0.99	1.01	375	382	466	711	890	892	1,360	1,680
		July-August-September				October-November-December			
0.01	100	4.5	8.1	10	13	3.0	11	14	18
0.02	50	5.9	11	13	17	4.4	15	18	22
0.05	20	8.9	16	18	24	7.8	22	26	32
0.10	10	13	22	25	33	13	32	37	45
0.20	5	20	33	38	49	22	48	54	66
0.50	2	48	72	82	107	62	100	112	136
0.80	1.25	120	157	181	245	158	197	221	280
0.90	1.11	194	235	276	383	249	275	309	406
0.96	1.04	328	360	434	624	380	386	436	601
0.98	1.02	462	474	584	860	470	477	542	774
0.99	1.01	600	606	764	1,150	565	572	655	969

05422000 WAPSIPINICON RIVER NEAR DE WITT, IOWA

LOCATION.—Lat 41°46'01", long 90°32'05", in SW1/4 NE1/4 sec. 6, T80N, R4E, Clinton County, Hydrologic Unit 07080103, on left bank 5 ft upstream from bridge on Highway 956, 0.9 mi downstream from Silver Creek, 4.0 mi south of water tower in De Witt, 6.2 mi upstream from Brophy Creek, and 18.2 mi upstream from mouth.

DRAINAGE AREA.—2,330 mi^2.

PERIOD OF RECORD.—July 1934 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 598.81 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 31,100 ft^3/s, June 17, 1990, gage height, 14.19 ft; minimum daily discharge, 46 ft^3/s, January 22, 1977.

Selected values from rating table number 16, developed October 1996

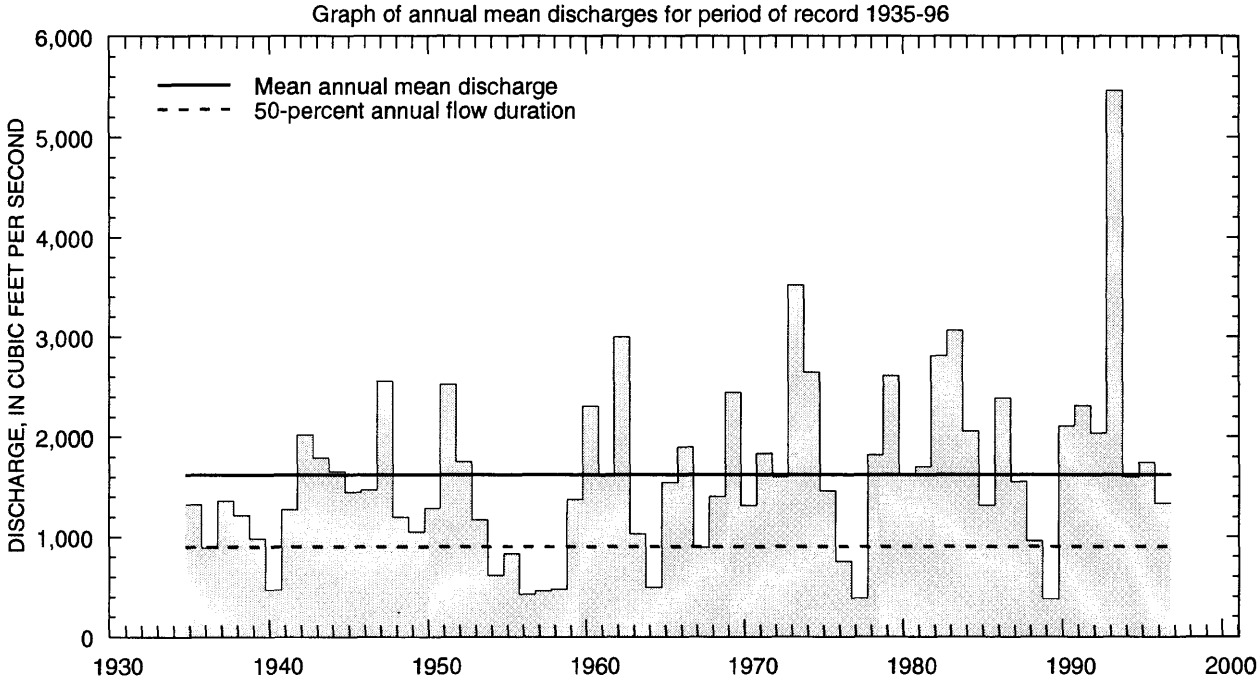
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	181	8.0	2,550
4.5	324	9.0	3,580
5.0	511	10.0	4,800
5.5	741	11.0	6,230
6.0	1,020	12.5	11,570
7.0	1,690	13.5	25,560

05422000 WAPSIPINICON RIVER NEAR DE WITT, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1935-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,549	1973	137	1977	905	887
November	6,435	1962	159	1965	1,118	1,122
December	4,945	1983	104	1977	927	884
January	4,086	1946	59.4	1977	840	793
February	3,798	1984	104	1940	1,210	866
March	7,143	1986	301	1954	2,984	1,738
April	9,768	1993	453	1977	2,977	2,130
May	6,351	1974	323	1977	2,299	1,613
June	10,950	1947	234	1977	2,300	1,892
July	14,280	1993	165	1936	1,704	2,114
August	8,550	1993	103	1936	1,139	1,404
September	5,647	1993	133	1976	1,048	1,185
Annual	5,461	1993	374	1989	1,621	876

Graph of annual mean discharges for period of record 1935-96



05422000 WAPSIPINICON RIVER NEAR DE WITT, IOWA—Continued

Monthly and annual flow durations, based on period of record 1935-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	125	135	90	61	100	266	410	299	202	149	102	119	105
95	152	164	125	104	139	410	520	411	336	211	170	150	168
90	176	200	150	154	194	540	800	620	472	283	206	202	226
85	205	224	200	190	250	700	935	729	560	368	258	236	283
80	222	262	241	230	310	920	1,080	842	652	433	302	262	354
75	237	311	282	263	360	1,100	1,230	934	770	520	351	289	425
70	288	416	340	301	410	1,310	1,390	1,050	918	612	398	317	500
60	378	535	450	430	530	1,710	1,690	1,280	1,250	755	490	378	671
50	550	700	611	548	700	2,200	2,060	1,570	1,590	941	595	456	900
40	704	900	810	640	880	2,720	2,590	1,960	1,960	1,220	730	592	1,200
30	972	1,250	1,000	850	1,100	3,500	3,230	2,390	2,530	1,610	921	895	1,650
25	1,130	1,410	1,170	964	1,400	4,020	3,740	2,810	2,860	1,900	1,070	1,080	1,960
20	1,420	1,640	1,370	1,100	1,700	4,600	4,310	3,280	3,360	2,180	1,250	1,330	2,320
15	1,760	1,930	1,560	1,390	2,140	5,370	5,130	4,070	4,020	2,590	1,620	1,690	2,900
10	2,230	2,320	2,000	1,830	2,910	6,560	6,590	5,270	5,110	3,370	2,320	2,230	3,840
5	3,040	3,420	2,900	2,600	4,290	8,450	8,550	7,030	6,570	5,840	4,820	3,660	5,700

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 62 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,220
0.95	1.05	3,600
0.90	1.11	4,600
0.80	1.25	6,120
0.50	2	10,200
0.20	5	16,200
0.10	10	20,400
0.04	25	25,600
0.02	50	29,500
0.01	100	33,300
0.005	200	37,100

Magnitude and frequency of annual high discharges, based on period of record 1935-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,720	1,280	970	789
0.95	1.05	2,940	2,320	1,790	1,440
0.90	1.11	3,820	3,090	2,410	1,930
0.80	1.25	5,160	4,270	3,360	2,670
0.50	2	8,650	7,350	5,860	4,610
0.20	5	13,500	11,500	9,240	7,230
0.10	10	16,600	14,100	11,300	8,820
0.04	25	20,300	17,100	13,600	10,600
0.02	50	22,900	19,100	15,200	11,800
0.01	100	25,300	20,900	16,600	12,900
0.005	200	27,600	22,600	17,900	13,900

05422000 WAPSIPINICON RIVER NEAR DE WITT, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1935 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	48	49	49	50	54	65	74	78	87
0.02	50	59	60	60	62	67	80	93	99	112
0.05	20	79	80	81	85	92	110	128	140	162
0.10	10	102	103	105	110	121	144	171	189	222
0.20	5	136	139	143	150	166	199	239	268	321
0.50	2	232	238	247	263	296	358	443	507	629
0.80	1.25	382	393	413	441	505	625	795	913	1,170
0.90	1.11	488	504	531	567	657	826	1,070	1,220	1,600
0.96	1.04	627	649	686	734	858	1,100	1,450	1,640	2,190
0.98	1.02	734	760	805	862	1,010	1,320	1,750	1,970	2,660
0.99	1.01	842	873	926	991	1,170	1,550	2,070	2,320	3,160

Magnitude and frequency of seasonal low discharges, based on period of record October 1934 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	49	50	51	56	137	153	171	207
0.02	50	63	64	66	74	169	188	210	255
0.05	20	89	92	96	111	230	253	284	347
0.10	10	119	126	132	157	299	329	369	455
0.20	5	169	181	193	235	409	449	505	628
0.50	2	317	349	378	482	719	797	904	1,150
0.80	1.25	569	637	701	927	1,220	1,380	1,580	2,050
0.90	1.11	759	854	949	1,270	1,580	1,820	2,100	2,750
0.96	1.04	1,020	1,150	1,290	1,750	2,070	2,430	2,810	3,750
0.98	1.02	1,220	1,380	1,560	2,130	2,450	2,920	3,390	4,560
0.99	1.01	1,440	1,630	1,840	2,530	2,840	3,430	4,000	5,430
		July-August-September				October-November-December			
0.01	100	89	92	99	116	60	60	61	66
0.02	50	99	103	110	128	73	74	76	84
0.05	20	117	123	131	151	98	102	106	118
0.10	10	139	146	156	179	127	135	141	159
0.20	5	174	183	197	225	173	187	199	228
0.50	2	286	305	328	382	309	347	378	444
0.80	1.25	517	559	603	740	545	626	702	849
0.90	1.11	733	798	864	1,100	730	845	961	1,180
0.96	1.04	1,100	1,200	1,310	1,770	992	1,160	1,330	1,670
0.98	1.02	1,450	1,600	1,740	2,460	1,210	1,410	1,640	2,080
0.99	1.01	1,880	2,080	2,270	3,360	1,440	1,680	1,980	2,530

05422470 CROW CREEK AT BETTENDORF, IOWA

LOCATION.—Lat 41°33'03", long 90°27'15", in NW1/4 NW1/4 sec. 24, T78N, R4E, Scott County, Hydrologic Unit 07080101, on left bank 200 ft upstream from bridge on Valley Road (old U.S. Highway 67), 3.5 mi east of U.S. Highway 6, and 0.7 mi upstream from mouth.

DRAINAGE AREA.—17.8 mi^2.

PERIOD OF RECORD.—October 1977 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 576.23 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 7,700 ft^3/s, June 16, 1990, gage height, 11.03 ft; minimum daily discharge, 0.13 ft^3/s, August 16, 1988.

Selected values from rating table number 5, developed October 1995

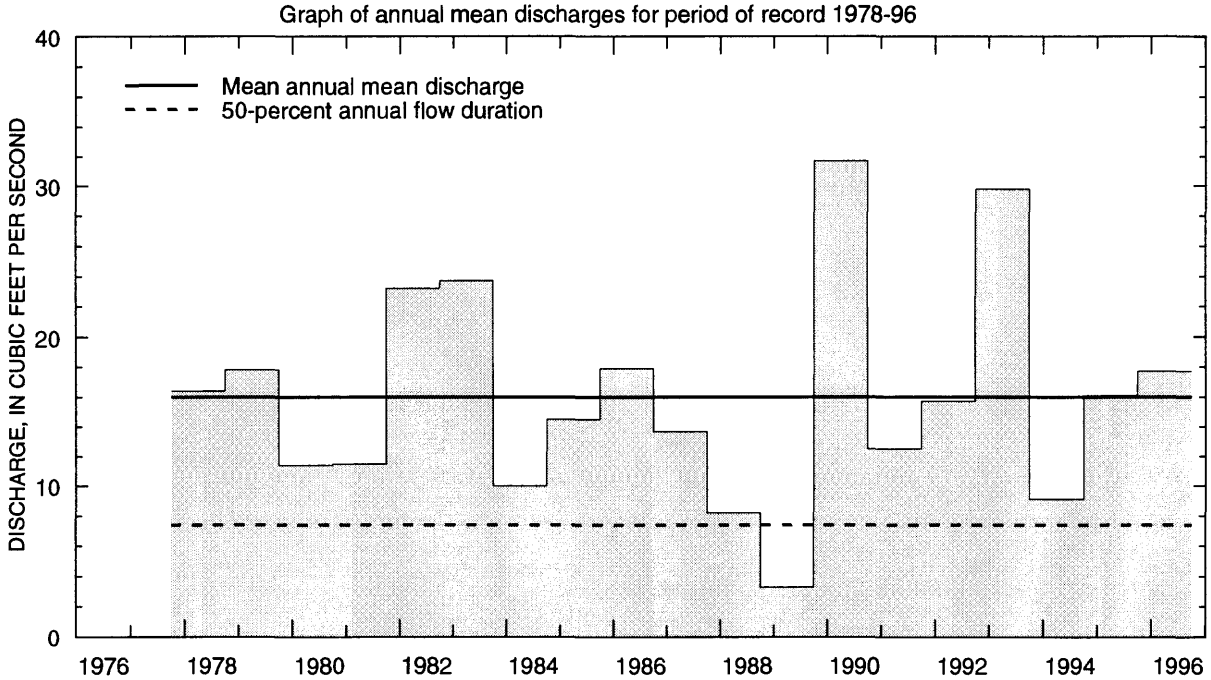
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.2	0.02	8.0	2,030
3.5	1.40	9.0	3,130
4.0	28.4	10.0	5,070
5.0	200	11.0	7,620
6.0	552	11.3	8,500
7.0	1,160		

05422470 CROW CREEK AT BETTENDORF, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1978-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	50.9	1982	0.67	1989	11.0	14.9
November	45.4	1993	1.19	1990	13.2	12.5
December	44.1	1983	0.77	1990	13.8	11.3
January	25.0	1988	1.18	1979	7.98	6.66
February	42.1	1985	0.76	1989	12.1	9.28
March	54.6	1979	3.45	1989	22.1	16.3
April	61.3	1983	2.33	1989	20.1	14.6
May	111	1996	1.68	1989	24.7	25.8
June	157	1990	3.17	1988	26.3	36.6
July	65.4	1992	0.74	1988	15.4	17.4
August	99.8	1990	0.85	1978	17.5	26.2
September	34.7	1992	0.49	1988	7.68	9.33
Annual	31.7	1990	3.35	1989	16.0	7.17

Graph of annual mean discharges for period of record 1978-96



05422470 CROW CREEK AT BETTENDORF, IOWA—Continued

Monthly and annual flow durations, based on period of record 1978-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.27	0.68	0.50	0.80	0.60	1.1	0.93	0.79	1.5	0.30	0.22	0.21	0.38
95	0.51	1.0	0.61	1.0	1.2	3.0	3.2	2.7	2.7	0.69	0.47	0.38	0.79
90	0.80	1.3	1.4	1.6	1.7	5.0	5.9	4.9	3.4	1.3	0.58	0.52	1.4
85	1.1	1.9	2.7	2.0	2.7	5.7	7.8	5.8	4.0	1.9	0.85	0.70	2.0
80	1.5	2.5	3.5	2.7	3.1	6.4	8.5	6.4	4.4	2.3	1.1	0.98	2.7
75	1.8	3.1	4.0	3.4	3.5	7.2	9.3	7.1	5.0	2.8	1.5	1.3	3.3
70	2.3	3.3	4.5	3.7	4.1	7.7	9.9	7.8	5.7	3.3	1.8	1.7	4.0
60	3.0	5.1	6.2	4.6	5.0	9.9	12	8.8	7.4	4.3	2.5	2.0	5.5
50	3.5	7.2	8.1	5.7	6.2	12	13	11	9.6	5.6	3.6	2.8	7.4
40	4.9	10	11	6.7	7.8	14	16	16	12	7.2	5.1	3.6	9.6
30	7.6	14	15	8.3	10	19	20	20	16	10	8.2	5.4	13
25	8.9	16	18	9.0	11	23	22	23	19	13	9.9	6.5	16
20	13	19	20	10	14	30	25	28	23	19	14	8.5	19
15	19	23	25	12	19	39	32	35	31	25	20	11	24
10	29	30	30	14	24	50	41	46	40	33	31	15	33
5	48	46	40	21	43	73	60	80	59	61	53	25	51

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 18 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	83
0.95	1.05	175
0.90	1.11	259
0.80	1.25	413
0.50	2	980
0.20	5	2,250
0.10	10	3,430
0.04	25	5,320
0.02	50	7,030
0.01	100	9,000
0.005	200	11,200

Magnitude and frequency of annual high discharges, based on period of record 1978-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	37	22	15	11
0.95	1.05	55	34	23	17
0.90	1.11	69	43	30	22
0.80	1.25	92	59	39	29
0.50	2	168	106	69	49
0.20	5	330	196	123	83
0.10	10	484	272	167	108
0.04	25	744	387	232	143
0.02	50	994	488	287	170
0.01	100	1,300	602	348	199
0.005	200	1,680	731	416	230

05422470 CROW CREEK AT BETTENDORF, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1978 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.06	0.07	0.09	0.13	0.19	0.31	0.35	0.40	0.58
0.02	50	0.09	0.10	0.13	0.18	0.26	0.41	0.47	0.55	0.83
0.05	20	0.15	0.17	0.21	0.29	0.41	0.61	0.73	0.88	1.4
0.10	10	0.24	0.26	0.32	0.42	0.59	0.85	1.1	1.3	2.0
0.20	5	0.41	0.44	0.51	0.66	0.91	1.3	1.6	2.1	3.2
0.50	2	1.0	1.1	1.2	1.5	1.9	2.5	3.5	4.7	6.9
0.80	1.25	2.2	2.3	2.5	2.9	3.5	4.6	6.9	9.7	13
0.90	1.11	3.2	3.3	3.6	4.0	4.7	6.1	9.6	14	17
0.96	1.04	4.5	4.7	5.0	5.4	6.1	8.2	13	20	22
0.98	1.02	5.5	5.8	6.2	6.6	7.2	9.7	16	24	26
0.99	1.01	6.6	7.0	7.4	7.7	8.3	11	19	29	29

Magnitude and frequency of seasonal low discharges, based on period of record October 1977 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.37	0.41	0.46	0.50	0.47	0.80	0.96	1.4
0.02	50	0.50	0.55	0.62	0.70	0.67	1.0	1.3	1.8
0.05	20	0.77	0.84	0.96	1.1	1.1	1.5	1.8	2.5
0.10	10	1.1	1.2	1.4	1.6	1.6	2.1	2.5	3.3
0.20	5	1.6	1.8	2.0	2.4	2.4	3.0	3.5	4.6
0.50	2	3.0	3.3	3.8	4.7	4.5	5.2	6.3	8.1
0.80	1.25	5.0	5.5	6.2	7.7	7.0	8.1	9.9	13
0.90	1.11	6.2	6.9	7.6	9.3	8.2	9.8	12	17
0.96	1.04	7.7	8.4	9.1	11	9.4	12	14	22
0.98	1.02	8.6	9.4	10	12	10	13	16	25
0.99	1.01	9.4	10	11	13	11	14	17	29
		July-August-September				October-November-December			
0.01	100	0.06	0.10	0.17	0.26	0.09	0.12	0.12	0.22
0.02	50	0.09	0.13	0.22	0.34	0.14	0.19	0.19	0.32
0.05	20	0.15	0.21	0.33	0.48	0.25	0.34	0.37	0.56
0.10	10	0.23	0.31	0.46	0.68	0.41	0.57	0.62	0.91
0.20	5	0.39	0.50	0.71	1.0	0.73	0.99	1.1	1.6
0.50	2	1.0	1.3	1.7	2.4	1.9	2.5	3.1	4.2
0.80	1.25	2.6	3.3	4.0	5.8	4.5	5.6	7.0	10
0.90	1.11	4.2	5.4	6.5	9.4	6.7	7.9	10	15
0.96	1.04	6.9	9.1	11	16	9.9	11	14	23
0.98	1.02	9.4	13	15	23	12	13	17	29
0.99	1.01	12	17	21	32	15	15	20	36

05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IOWA

LOCATION.—Lat 42°57'50", long 93°42'20", in NE1/4 NW1/4 sec. 17, T94N, R24W, Hancock County, Hydrologic Unit 07080207, on downstream side of highway bridge, 6 mi southwest of Klemme and 12.4 mi upstream from confluence with East Fork Iowa River.

DRAINAGE AREA.—112 mi^2.

PERIOD OF RECORD.—April 1948 to September 1958 (discontinued).

GAGE.—Wire-weight gage read once daily, more often at high stages. Datum of gage is 1,180.83 ft above sea level. Prior to June 13, 1948, at datum 1.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 1,920 ft^3/s, June 21, 1954, gage height, 14.97 ft; minimum daily discharge, 0.2 ft^3/s, September 29, 30, 1958.

Selected values from rating table number 1, developed April 1955
(A discharge measurement to validate this rating has not been made since October 1958)

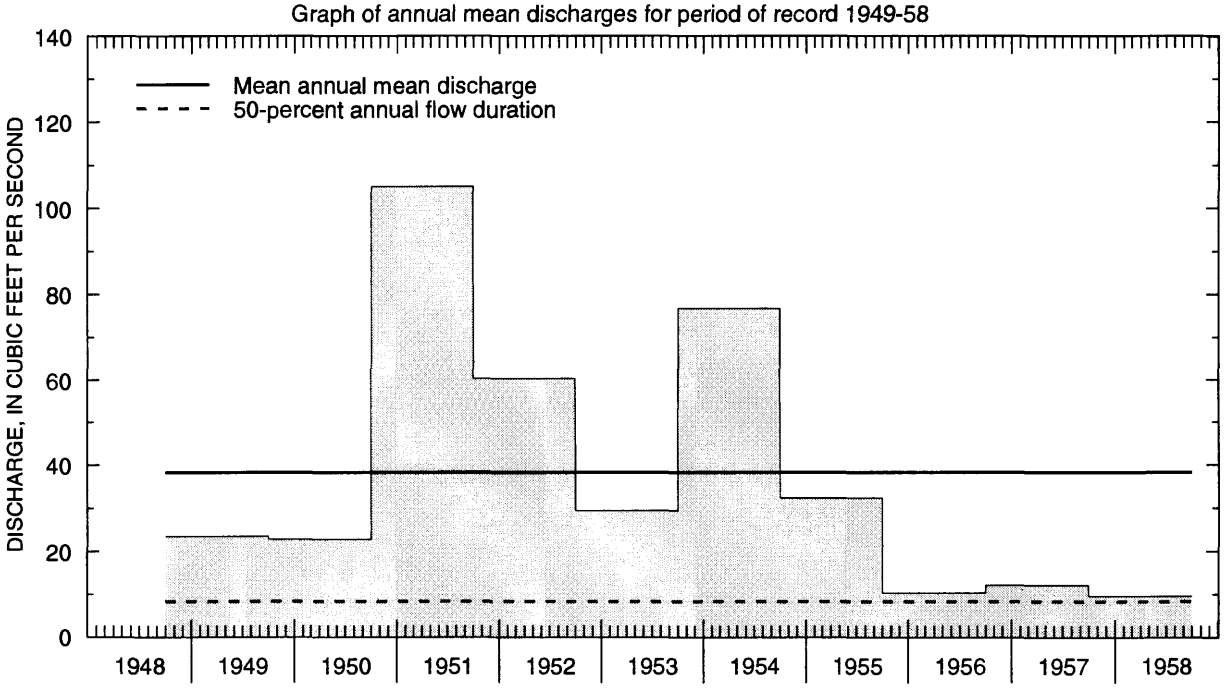
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	25.2	10.0	940
4.0	155	12.0	1,290
6.0	360	14.0	1,700
8.0	630		

05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1949-58

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	81.7	1955	1.80	1949	14.9	25.2
November	30.9	1955	1.78	1957	8.06	10.0
December	19.6	1955	0.57	1956	5.54	6.42
January	11.9	1952	0.44	1956	3.96	4.36
February	80.3	1952	0.63	1956	16.5	26.7
March	173	1952	9.31	1958	71.0	59.8
April	505	1951	8.68	1957	90.2	151
May	112	1951	8.94	1949	45.2	31.5
June	582	1954	6.32	1956	114	176
July	187	1951	4.61	1949	52.0	60.1
August	102	1954	1.52	1949	26.2	33.3
September	39.7	1954	0.51	1958	10.9	14.1
Annual	105	1951	9.46	1958	38.2	32.1

Graph of annual mean discharges for period of record 1949-58



05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Monthly and annual flow durations, based on period of record 1949-58

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.0	1.1	0.40	0.30	0.30	0.89	6.1	3.8	4.4	2.5	0.60	0.30	0.40
95	1.2	1.5	0.50	0.40	0.30	2.7	6.6	5.2	4.8	4.0	1.0	0.50	0.80
90	1.7	1.8	0.91	0.50	0.40	3.6	7.7	6.5	5.2	4.8	1.4	0.80	1.4
85	2.0	2.0	1.6	0.56	0.70	6.9	8.6	7.9	9.0	5.8	2.1	1.2	1.8
80	2.3	2.2	1.6	0.80	0.80	7.4	9.5	9.8	12	6.6	3.0	2.5	2.3
75	2.5	2.5	1.8	0.90	0.80	9.1	11	12	14	7.8	3.8	2.8	2.8
70	2.8	2.8	1.8	1.1	1.0	13	12	14	16	8.6	4.4	3.2	3.5
60	3.3	3.3	2.2	1.6	1.3	19	20	24	20	12	5.7	3.6	5.2
50	4.6	3.8	2.7	2.0	1.7	30	27	30	26	16	7.8	4.3	8.3
40	5.1	4.3	3.1	2.1	2.4	44	39	36	35	24	10	5.2	13
30	7.7	5.4	4.1	2.9	5.1	57	59	46	48	37	15	7.4	22
25	10	6.1	5.9	7.0	7.1	68	73	52	54	44	18	9.7	28
20	17	16	11	9.0	10	90	107	59	65	60	28	21	37
15	28	20	12	11	14	122	136	72	82	93	37	25	50
10	48	26	16	12	40	200	210	92	163	154	52	29	70
5	70	31	22	13	97	321	446	152	812	257	96	41	145

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 10 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	86
0.95	1.05	136
0.90	1.11	177
0.80	1.25	245
0.50	2	474
0.20	5	965
0.10	10	1,430
0.04	25	2,210
0.02	50	2,950
0.01	100	3,850
0.005	200	4,930

[a]Station skew only used in analysis.

Magnitude and frequency of annual high discharges, based on period of record 1949-58

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	76	55	39	23
0.95	1.05	107	76	53	34
0.90	1.11	133	93	65	43
0.80	1.25	178	125	87	59
0.50	2	342	247	173	120
0.20	5	752	587	419	285
0.10	10	1,200	999	724	476
0.04	25	2,070	1,870	1,390	863
0.02	50	--	--	--	--
0.01	100	--	--	--	--
0.005	200	--	--	--	--

05448500 WEST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1948 to March 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.15	0.15	0.15	0.20	0.26	0.32	0.72	1.0
0.02	50	0.18	0.18	0.18	0.18	0.24	0.31	0.38	0.78	1.1
0.05	20	0.23	0.24	0.24	0.25	0.31	0.42	0.52	0.91	1.2
0.10	10	0.30	0.31	0.31	0.33	0.41	0.56	0.70	1.1	1.5
0.20	5	0.42	0.44	0.46	0.49	0.60	0.81	1.0	1.4	1.9
0.50	2	0.97	1.0	1.1	1.2	1.4	1.8	2.3	2.7	3.7
0.80	1.25	2.9	3.0	3.2	3.3	3.7	4.7	6.1	6.8	9.6
0.90	1.11	5.6	5.8	6.0	6.2	6.7	8.1	11	12	18
0.96	1.04	12	12	13	13	13	15	20	25	40
0.98	1.02	21	21	21	21	21	23	30	41	70
0.99	1.01	33	33	33	33	33	35	46	68	121

Magnitude and frequency of seasonal low discharges, based on period of record April 1948 to September 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.15	0.15	0.15	0.20	2.0	2.2	2.2	2.4
0.02	50	0.18	0.18	0.18	0.24	2.3	2.5	2.5	2.9
0.05	20	0.24	0.24	0.25	0.31	2.9	3.2	3.2	3.8
0.10	10	0.32	0.32	0.33	0.41	3.5	3.9	4.1	5.0
0.20	5	0.47	0.48	0.50	0.60	4.5	5.0	5.5	7.0
0.50	2	1.1	1.2	1.2	1.4	7.7	8.7	10	14
0.80	1.25	3.2	3.3	3.4	3.8	14	16	20	29
0.90	1.11	6.0	6.1	6.3	6.9	21	23	29	43
0.96	1.04	12	13	13	14	31	35	45	67
0.98	1.02	21	21	21	23	40	46	61	90
0.99	1.01	33	33	33	36	52	59	79	119
		July-August-September				October-November-December			
0.01	100	0.08	0.17	0.21	0.26	0.25	0.25	0.28	0.43
0.02	50	0.12	0.24	0.28	0.36	0.31	0.32	0.35	0.50
0.05	20	0.24	0.40	0.46	0.58	0.41	0.44	0.48	0.66
0.10	10	0.44	0.62	0.71	0.88	0.54	0.61	0.66	0.87
0.20	5	0.85	1.1	1.2	1.5	0.79	0.91	0.99	1.2
0.50	2	2.7	2.9	3.3	4.1	1.8	2.2	2.3	2.8
0.80	1.25	7.6	7.9	9.0	12	4.9	5.7	6.0	7.1
0.90	1.11	12	13	15	21	9.0	9.8	10	12
0.96	1.04	20	22	27	38	18	18	19	23
0.98	1.02	27	32	40	57	28	28	28	36
0.99	1.01	34	43	55	82	41	41	41	54

05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IOWA

LOCATION.—Lat 43°00'31", long 93°37'42", in NE1/4 NW1/4 sec. 36, T95N, R24W, Hancock County, Hydrologic Unit 07080207, on left bank 15 ft upstream from bridge on County Highway B55, 1.2 mi west of Chicago, Rock Island and Pacific Railroad crossing in Klemme, 1.5 mi upstream from Drainage Ditch 9, 18.2 mi upstream from confluence with West Branch Iowa River and at mile 341.0.

DRAINAGE AREA.—133 mi^2.

PERIOD OF RECORD.—April 1948 to September 1976, June 1977 to September 1995 (discontinued). Prior to October 1958, published as East Fork Iowa River near Klemme.

GAGE.—Water-stage recorder. Datum of gage is 1,179.33 ft above sea level. April 1, 1948, to September 30, 1955, nonrecording gage at site 0.6 mi upstream at datum 0.80 ft higher. October 1, 1955, to September 30, 1969, at present site at datum 0.31 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 5,960 ft^3/s, June 19, 1954; maximum gage height, 10.67 ft, April 6, 1965; no flow December 21, 1989–January 7, 1990.

Selected values from rating table number 7, developed October 1988
(A discharge measurement to validate this rating has not been made since September 1995)

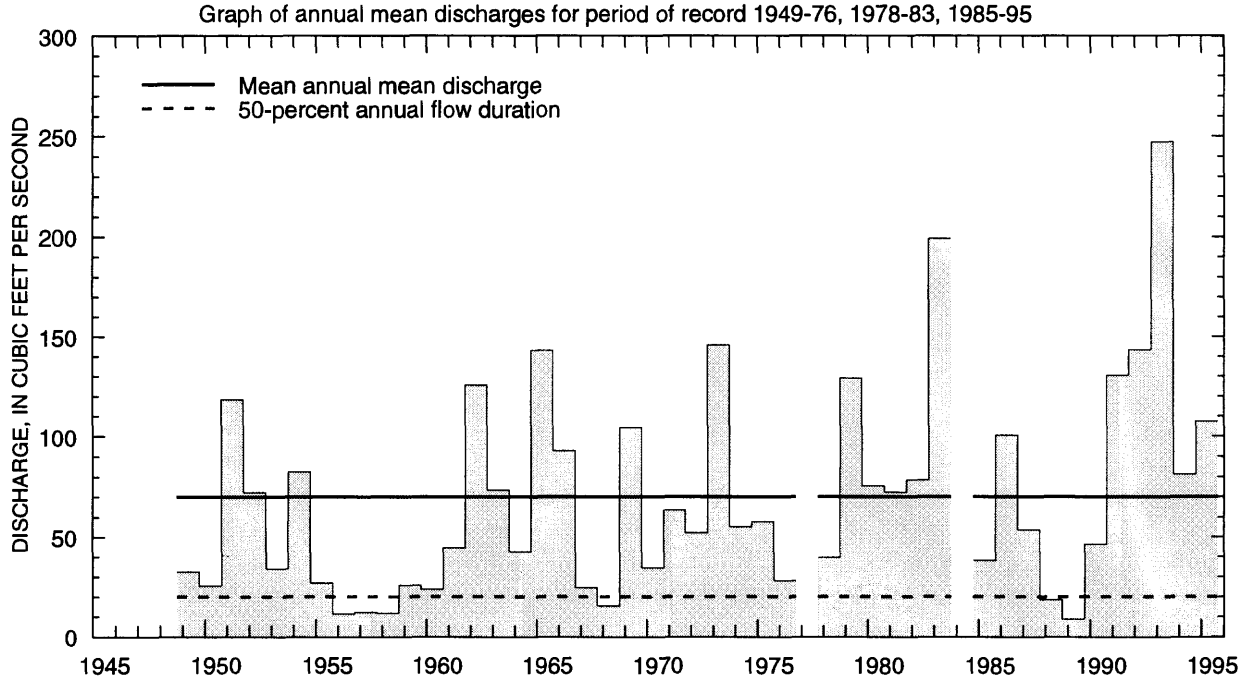
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	0.55	7.0	530
2.5	7.8	8.0	697
3.0	45	9.0	966
4.0	135	10.0	1,900
5.0	247	11.0	5,200

05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1949-76, 1978-83, 1985-95

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	217	1987	2.08	1949	41.9	54.7
November	234	1993	1.78	1990	38.8	53.2
December	215	1983	0.68	1990	27.4	44.4
January	88.8	1992	0.15	1990	13.3	19.0
February	226	1983	0.28	1959	24.7	43.2
March	441	1973	4.25	1975	121	109
April	728	1965	7.41	1957	145	158
May	435	1991	7.44	1989	101	92.1
June	637	1954	3.63	1989	129	131
July	487	1993	2.47	1989	90.8	112
August	656	1979	4.70	1949	52.8	106
September	455	1965	3.63	1958	53.1	83.2
Annual	247	1993	8.74	1989	70.0	52.6

Graph of annual mean discharges for period of record 1949-76, 1978-83, 1985-95



05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Monthly and annual flow durations, based on period of record 1949-76, 1978-83, 1985-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.8	1.5	0.19	0.13	0.30	0.60	5.3	4.7	3.4	2.1	3.0	2.6	0.67
95	2.8	3.1	1.7	0.50	0.78	3.5	9.0	7.9	7.9	6.4	4.7	3.5	2.3
90	4.0	4.2	2.7	1.4	1.3	5.2	12	12	11	7.5	5.6	4.5	3.7
85	4.7	5.0	3.2	1.8	1.7	7.4	17	16	14	9.4	6.2	5.1	4.9
80	5.2	5.6	3.7	2.3	2.1	9.2	25	20	17	11	7.0	5.6	6.0
75	6.1	6.4	4.4	2.9	2.6	12	31	26	20	12	8.1	6.0	7.5
70	6.9	7.4	5.4	3.2	3.1	17	37	31	24	14	8.9	7.4	9.0
60	8.8	10	8.4	4.3	4.3	28	55	40	34	21	11	9.2	13
50	13	16	13	6.0	6.4	41	76	55	50	30	14	12	20
40	23	26	17	8.5	9.1	62	100	74	70	43	18	16	31
30	40	36	24	13	15	100	136	103	100	64	26	30	50
25	51	42	28	15	19	144	161	120	125	84	34	40	65
20	65	56	32	20	22	186	199	141	165	114	47	55	85
15	86	68	39	22	28	238	246	183	224	172	62	77	118
10	116	98	60	26	40	348	336	243	325	245	112	111	175
5	160	151	93	48	89	492	538	375	535	429	235	212	302

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 46 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	115
0.95	1.05	216
0.90	1.11	300
0.80	1.25	444
0.50	2	920
0.20	5	1,860
0.10	10	2,660
0.04	25	3,870
0.02	50	4,900
0.01	100	6,050
0.005	200	7,330

Magnitude and frequency of annual high discharges, based on period of record 1949-76, 1978-83, 1985-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	83	64	44	29
0.95	1.05	160	119	82	55
0.90	1.11	225	164	112	77
0.80	1.25	332	237	163	113
0.50	2	670	467	320	225
0.20	5	1,270	880	603	417
0.10	10	1,730	1,210	828	562
0.04	25	2,370	1,670	1,150	758
0.02	50	2,880	2,040	1,400	911
0.01	100	3,410	2,440	1,680	1,070
0.005	200	3,950	2,860	1,970	1,230

05449000 EAST BRANCH IOWA RIVER NEAR KLEMME, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record
April 1948 to March 1976, April 1978 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.10	0.23	0.37	0.58	0.89
0.02	50	0.00	0.00	0.00	0.00	0.17	0.37	0.56	0.84	1.2
0.05	20	0.30	0.32	0.36	0.40	0.40	0.71	1.0	1.4	2.0
0.10	10	0.60	0.64	0.70	0.79	0.79	1.2	1.7	2.2	3.2
0.20	5	1.2	1.3	1.4	1.5	1.6	2.3	3.0	3.8	5.4
0.50	2	3.4	3.6	3.8	4.1	5.2	6.6	8.5	10	15
0.80	1.25	8.0	8.4	8.8	9.6	12	16	22	27	41
0.90	1.11	12	12	13	14	17	23	34	43	69
0.96	1.04	17	18	19	21	23	34	54	70	121
0.98	1.02	21	22	24	27	27	42	71	96	174
0.99	1.01	25	27	29	31	31	50	90	126	240

Magnitude and frequency of seasonal low discharges, based on period of record
April 1948 to September 1976, July 1977 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.11	0.19	1.6	2.1	2.3	2.8
0.02	50	0.00	0.00	0.18	0.29	2.1	2.8	3.1	3.8
0.05	20	0.33	0.37	0.37	0.53	3.1	4.2	4.8	6.0
0.10	10	0.63	0.68	0.68	0.90	4.5	6.1	7.0	9.0
0.20	5	1.2	1.3	1.4	1.7	7.0	9.5	11	15
0.50	2	3.8	4.0	4.6	5.2	17	22	27	37
0.80	1.25	11	11	13	15	41	51	64	93
0.90	1.11	19	20	22	25	67	80	100	150
0.96	1.04	32	34	35	43	113	128	163	250
0.98	1.02	45	50	51	59	159	173	223	347
0.99	1.01	61	69	70	79	217	227	295	466
		July-August-September				October-November-December			
0.01	100	0.89	1.2	1.3	1.7	0.00	0.00	0.50	0.58
0.02	50	1.2	1.5	1.7	2.0	0.00	0.00	0.70	0.84
0.05	20	1.7	2.1	2.3	2.7	0.70	1.0	1.1	1.4
0.10	10	2.4	2.8	3.1	3.6	1.2	1.7	1.8	2.3
0.20	5	3.5	4.1	4.4	5.1	2.3	3.0	3.2	4.0
0.50	2	7.3	8.2	8.8	11	6.3	7.7	11	11
0.80	1.25	14	16	18	25	16	19	25	29
0.90	1.11	20	23	25	39	26	31	33	47
0.96	1.04	29	33	38	66	43	51	52	77
0.98	1.02	36	42	49	94	59	70	75	104
0.99	1.01	43	52	61	129	79	94	100	137

05449500 IOWA RIVER NEAR ROWAN, IOWA

LOCATION.—Lat 42°45'36", long 93°37'23", in NW1/4 NE1/4 sec. 25, T92N, R24W, Wright County, Hydrologic Unit 07080207, on left bank 10 ft downstream from bridge on County Highway C38, 0.9 mi downstream from Drainage Ditch 123, 3.8 mi northwest of Rowan, 10.7 mi downstream from confluence of East and West Branches and at mile 316.4.

DRAINAGE AREA.—429 mi^2.

PERIOD OF RECORD.—October 1940 to September 1976, June 1977 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,143.35 ft above sea level. Prior to October 14, 1948, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,460 ft^3/s, June 21, 1954, gage height, 14.88 ft; minimum daily discharge, 2.8 ft^3/s, December 22, 1989.

Selected values from rating table number 12, developed June 1997

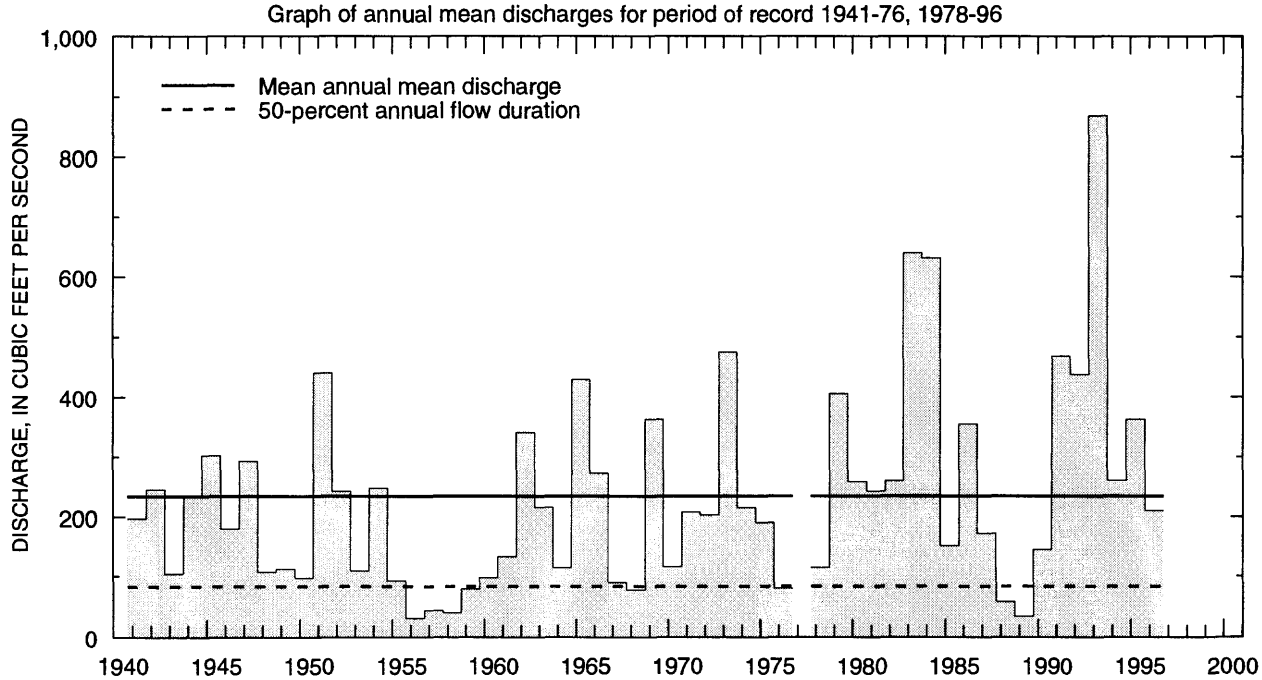
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.4	30.5	10.0	1,510
5.0	274	11.0	2,090
6.0	476	12.0	2,940
7.0	705	13.0	4,000
8.0	955	14.0	5,280
9.0	1,230	15.0	6,800

05449500 IOWA RIVER NEAR ROWAN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-76, 1978-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	720	1987	8.14	1990	139	170
November	695	1993	9.49	1990	133	160
December	588	1983	5.62	1990	86.0	109
January	298	1983	3.63	1959	55.7	59.2
February	932	1984	3.54	1959	106	168
March	1,415	1973	23.9	1968	391	322
April	2,439	1965	32.4	1957	473	515
May	1,793	1991	44.3	1989	345	329
June	2,452	1984	19.2	1989	469	470
July	1,922	1993	14.9	1989	299	366
August	1,684	1979	14.3	1948	164	280
September	1,213	1965	8.83	1958	150	226
Annual	869	1993	30.4	1956	234	169

Graph of annual mean discharges for period of record 1941-76, 1978-96



05449500 IOWA RIVER NEAR ROWAN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-76, 1978-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	7.9	9.2	4.3	3.7	3.5	8.1	24	21	17	14	10	7.1	6.0
95	12	13	9.7	6.0	6.2	18	37	36	32	22	15	11	12
90	15	16	14	7.6	7.9	27	47	49	43	29	18	14	17
85	18	20	16	13	11	34	76	60	57	36	22	17	21
80	22	23	18	15	14	43	101	80	72	41	27	20	26
75	27	27	21	17	18	64	121	101	88	51	32	25	31
70	30	30	25	19	20	85	138	115	109	61	36	28	37
60	37	44	33	23	25	121	188	146	152	85	45	35	57
50	52	63	47	28	30	170	244	192	210	120	57	50	83
40	89	95	64	44	45	250	332	248	293	164	75	71	122
30	135	132	83	63	74	408	456	337	422	227	101	94	182
25	180	158	100	74	83	500	536	418	535	300	130	118	227
20	220	188	118	80	100	607	666	511	682	394	157	155	294
15	273	238	149	98	134	781	835	613	899	548	223	212	400
10	357	344	200	118	209	1,040	1,160	815	1,190	808	337	329	590
5	500	461	269	180	340	1,530	1,730	1,200	1,690	1,300	761	600	1,020

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 55 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	294
0.95	1.05	545
0.90	1.11	746
0.80	1.25	1,070
0.50	2	2,060
0.20	5	3,730
0.10	10	4,970
0.04	25	6,650
0.02	50	7,950
0.01	100	9,290
0.005	200	10,700

Magnitude and frequency of annual high discharges, based on period of record 1941-76, 1978-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	238	176	145	104
0.95	1.05	467	357	272	202
0.90	1.11	652	505	374	280
0.80	1.25	953	749	540	407
0.50	2	1,840	1,470	1,040	775
0.20	5	3,250	2,600	1,870	1,360
0.10	10	4,230	3,380	2,480	1,760
0.04	25	5,460	4,340	3,290	2,270
0.02	50	6,370	5,040	3,910	2,650
0.01	100	7,250	5,700	4,540	3,010
0.005	200	8,110	6,340	5,180	3,370

05449500 IOWA RIVER NEAR ROWAN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1941 to March 1976, April 1978 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.1	2.2	2.3	2.5	3.0	3.6	4.2	5.0	6.0
0.02	50	2.8	2.8	3.0	3.2	3.8	4.6	5.5	6.4	6.5
0.05	20	4.0	4.1	4.4	4.7	5.5	6.8	8.0	9.3	10
0.10	10	5.6	5.8	6.1	6.5	7.6	9.5	11	13	15
0.20	5	8.4	8.7	9.1	9.7	11	14	17	19	24
0.50	2	18	18	19	20	23	29	36	43	58
0.80	1.25	36	37	39	41	46	59	76	93	139
0.90	1.11	52	54	56	60	66	84	112	141	218
0.96	1.04	77	79	82	87	95	121	168	219	349
0.98	1.02	98	100	104	111	120	152	217	292	472
0.99	1.01	122	124	129	138	148	185	274	377	618

Magnitude and frequency of seasonal low discharges, based on period of record October 1940 to September 1976, July 1977 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.4	2.5	2.6	3.0	10	11	11	14
0.02	50	3.1	3.2	3.3	3.8	12	13	14	18
0.05	20	4.4	4.6	4.8	5.6	17	19	21	26
0.10	10	6.1	6.4	6.7	7.8	23	26	29	37
0.20	5	9.1	9.6	10	12	33	39	45	57
0.50	2	19	21	22	26	70	84	99	132
0.80	1.25	42	45	49	59	153	181	220	309
0.90	1.11	63	68	74	89	234	273	335	485
0.96	1.04	98	106	116	141	374	423	525	786
0.98	1.02	130	141	155	188	509	563	702	1,080
0.99	1.01	168	182	202	245	676	729	911	1,430
		July-August-September				October-November-December			
0.01	100	4.2	5.0	5.8	7.1	3.0	3.5	3.7	4.7
0.02	50	5.3	6.2	7.0	8.4	3.9	4.5	4.9	6.1
0.05	20	7.6	8.6	9.5	11	5.9	6.7	7.4	8.9
0.10	10	10	12	13	14	8.3	9.5	11	13
0.20	5	15	16	18	20	13	14	16	19
0.50	2	30	32	35	40	28	31	36	42
0.80	1.25	60	65	71	91	59	68	78	94
0.90	1.11	85	93	105	143	87	100	115	143
0.96	1.04	122	137	161	242	132	151	173	224
0.98	1.02	155	177	213	345	171	197	225	299
0.99	1.01	191	222	275	480	217	249	284	389

05451500 IOWA RIVER AT MARSHALLTOWN, IOWA

LOCATION.—Lat 42°03'57", long 92°54'27", in SE1/4 SE1/4 sec. 23, T84N, R18W, Marshall County, Hydrologic Unit 07080208, on right bank 10 ft downstream from bridge on State Highway 14, 1,500 ft upstream from Burnett Creek, 2.2 mi upstream from Linn Creek, and at mile 222.8.

DRAINAGE AREA.—1,532 mi^2.

PERIOD OF RECORD.—October 1902 to September 1903, October 1914 to September 1927, October 1932 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 853.10 ft above sea level. See WSP 1728 for history of changes prior to September 21, 1934.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 42,000 ft^3/s, June 4, 1918; maximum gage height, 20.77 ft, August 17, 1993; minimum daily discharge, 4.7 ft^3/s, January 25, 1977.

Selected values from rating table number 24, developed October 1992

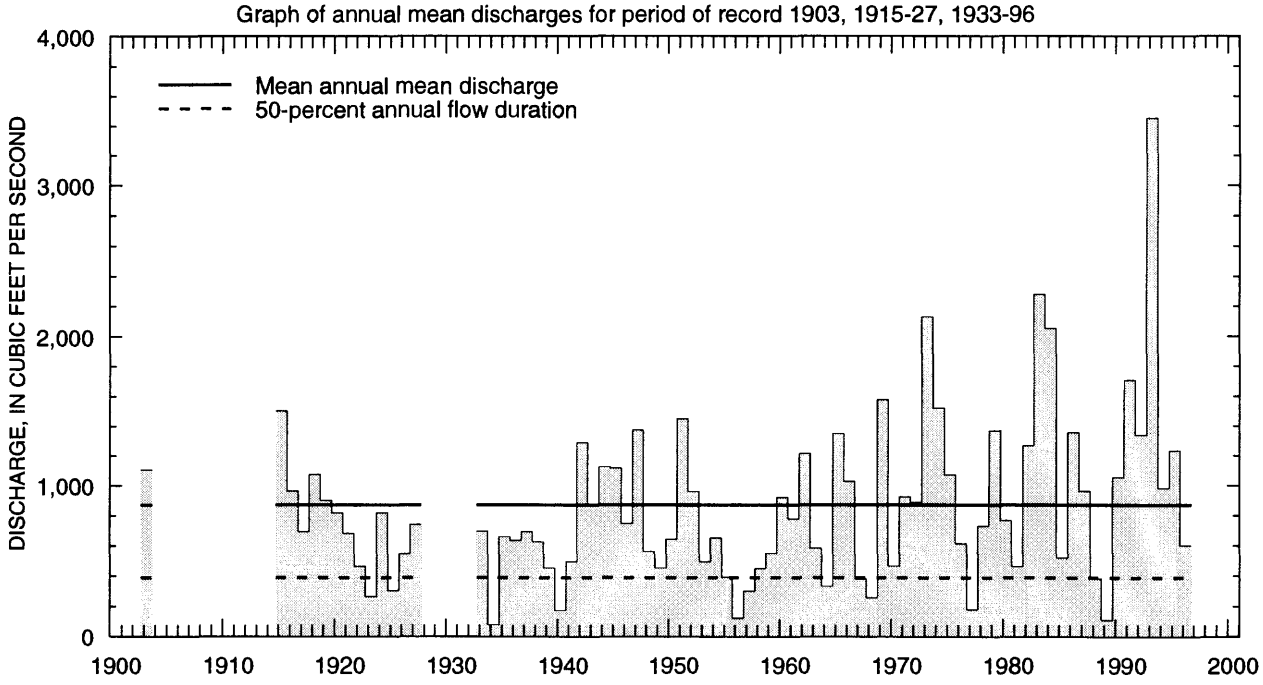
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.0	30.8	14.0	3,180
8.0	68.3	16.0	5,030
9.0	348	18.0	9,210
10.0	818	20.0	15,100
12.0	1,930	21.5	21,100

05451500 IOWA RIVER AT MARSHALLTOWN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1903, 1915-27, 1933-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,721	1987	39.2	1940	505	561
November	2,593	1973	46.2	1940	496	506
December	2,139	1983	31.0	1990	359	398
January	2,231	1973	10.2	1977	306	349
February	3,424	1915	20.9	1940	627	648
March	4,206	1973	98.4	1934	1,588	1,062
April	6,796	1965	99.3	1934	1,478	1,343
May	5,559	1991	49.9	1934	1,289	1,091
June	7,619	1918	16.0	1934	1,711	1,566
July	8,389	1993	41.8	1977	1,000	1,305
August	7,062	1993	35.9	1934	568	894
September	3,362	1993	27.5	1939	509	588
Annual	3,456	1993	77.3	1934	870	555

Graph of annual mean discharges for period of record 1903, 1915-27, 1933-96



05451500 IOWA RIVER AT MARSHALLTOWN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1903, 1915-27, 1933-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	34	43	25	11	17	56	100	66	20	29	28	26	27
95	47	57	36	30	31	120	143	129	100	57	50	46	49
90	63	71	50	39	50	173	215	175	160	92	65	62	72
85	77	84	60	50	68	250	299	234	235	136	87	79	94
80	86	105	76	65	93	320	386	307	303	184	107	90	121
75	98	125	90	75	110	402	478	394	401	228	123	105	154
70	129	148	110	90	125	496	562	472	501	272	141	125	190
60	196	235	170	130	170	711	723	659	697	377	186	184	280
50	266	298	222	170	260	974	926	831	985	522	246	260	390
40	336	380	282	230	360	1,300	1,190	1,050	1,320	724	340	347	562
30	493	550	360	300	559	1,750	1,550	1,370	1,790	990	460	455	819
25	597	670	410	351	680	2,080	1,800	1,620	2,130	1,140	550	530	985
20	811	780	530	430	832	2,440	2,180	1,950	2,490	1,330	676	619	1,210
15	1,000	895	660	500	1,000	2,970	2,650	2,350	3,030	1,620	848	775	1,550
10	1,270	1,130	844	640	1,490	3,700	3,310	2,920	3,990	2,040	1,110	1,140	2,130
5	1,840	1,590	1,160	1,000	2,500	5,330	4,860	4,110	6,110	3,130	2,150	1,980	3,240

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 83 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,370
0.95	1.05	2,440
0.90	1.11	3,260
0.80	1.25	4,560
0.50	2	8,220
0.20	5	14,000
0.10	10	18,000
0.04	25	23,100
0.02	50	26,900
0.01	100	30,700
0.005	200	34,500

Magnitude and frequency of annual high discharges, based on period of record 1903, 1915-27, 1933-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	669	452	349	248
0.95	1.05	1,430	1,070	819	609
0.90	1.11	2,050	1,600	1,220	922
0.80	1.25	3,080	2,470	1,880	1,430
0.50	2	6,030	4,920	3,710	2,810
0.20	5	10,400	8,180	6,140	4,510
0.10	10	13,100	10,000	7,510	5,390
0.04	25	16,300	11,900	8,930	6,220
0.02	50	18,500	13,100	9,780	6,670
0.01	100	20,500	14,000	10,500	7,030
0.005	200	22,200	14,800	11,100	7,300

05451500 IOWA RIVER AT MARSHALLTOWN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1915 to March 1927, April 1933 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.4	6.5	7.0	7.9	11	14	19	22	25
0.02	50	8.8	9.0	9.6	11	14	18	24	28	34
0.05	20	14	14	15	17	21	27	35	42	52
0.10	10	20	21	23	25	30	38	49	59	76
0.20	5	32	33	35	38	46	58	73	89	118
0.50	2	71	74	78	85	98	125	158	194	266
0.80	1.25	145	152	160	173	199	261	338	421	567
0.90	1.11	205	214	225	244	284	380	504	628	826
0.96	1.04	291	300	315	346	410	561	771	959	1,220
0.98	1.02	360	370	387	427	515	718	1,010	1,260	1,550
0.99	1.01	432	442	462	514	629	894	1,300	1,610	1,910

Magnitude and frequency of seasonal low discharges, based on period of record October 1902 to September 1903, October 1914 to September 1927, October 1932 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7.7	8.2	9.0	12	19	23	25	31
0.02	50	11	12	13	17	28	33	37	47
0.05	20	18	19	20	27	48	57	64	83
0.10	10	27	29	31	40	75	90	102	133
0.20	5	44	47	50	64	126	151	173	227
0.50	2	103	111	120	154	305	365	422	567
0.80	1.25	220	242	265	356	656	769	900	1,230
0.90	1.11	317	351	390	544	935	1,080	1,270	1,760
0.96	1.04	456	510	575	844	1,320	1,500	1,770	2,480
0.98	1.02	568	641	730	1,110	1,620	1,820	2,140	3,030
0.99	1.01	687	780	898	1,420	1,920	2,130	2,520	3,580
		July-August-September				October-November-December			
0.01	100	12	16	19	25	14	15	16	20
0.02	50	16	20	23	30	18	19	20	26
0.05	20	23	28	32	41	26	28	30	38
0.10	10	32	38	43	54	36	39	43	53
0.20	5	47	55	63	78	53	58	65	80
0.50	2	104	116	131	163	111	126	142	173
0.80	1.25	231	255	285	368	232	269	308	378
0.90	1.11	353	393	436	579	339	397	459	568
0.96	1.04	557	630	695	960	507	600	700	876
0.98	1.02	751	862	947	1,350	656	781	918	1,160
0.99	1.01	983	1,150	1,260	1,850	827	990	1,170	1,490

05451700 TIMBER CREEK NEAR MARSHALLTOWN, IOWA

LOCATION.—Lat 42°00'32", long 92°51'08", in SE1/4 SW1/4 sec. 8, T83N, R17W, Marshall County, Hydrologic Unit 07080208, on left bank 20 ft upstream from bridge on Shady Oaks Road, 3.0 mi upstream from mouth, and 3.0 mi southeast of Marshalltown.

DRAINAGE AREA.—118 mi^2.

PERIOD OF RECORD.—October 1949 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 849.44 ft above sea level. Prior to October 1, 1991 at site 1/8 mile upstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,000 ft^3/s, August 16, 1977, gage height, 17.69 ft; no flow several days in July and October, 1956, January, February, and July, 1977.

Selected values from rating table number 12, developed October 1992

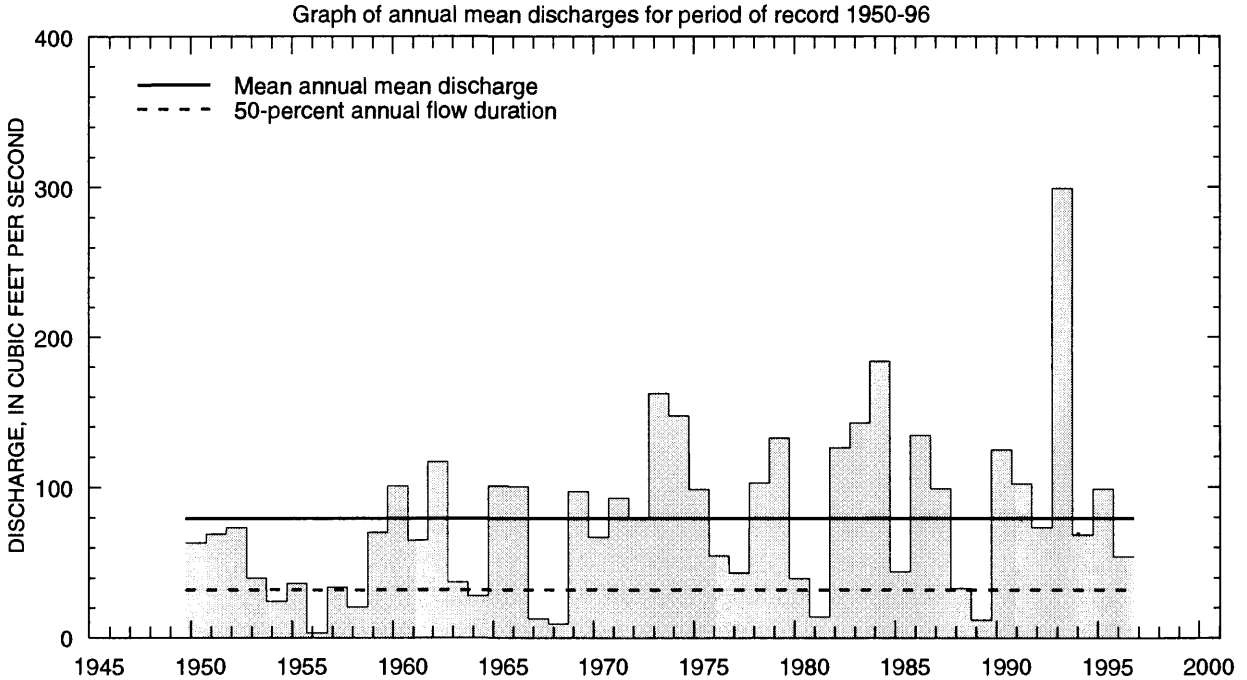
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	4.8	10.0	931
2.0	21.5	12.0	1,300
3.0	78.2	14.0	1,850
4.0	153	16.0	5,060
6.0	354	18.0	12,000
8.0	615		

05451700 TIMBER CREEK NEAR MARSHALLTOWN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1950-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	286	1987	0.76	1951	37.7	54.0
November	265	1984	1.11	1951	40.0	51.0
December	183	1984	0.60	1956	36.3	44.2
January	200	1973	0.054	1977	37.0	42.6
February	351	1971	3.07	1954	87.4	83.7
March	597	1979	5.11	1956	145	135
April	385	1993	2.84	1956	107	101
May	447	1974	3.08	1977	126	114
June	493	1984	1.09	1977	142	129
July	866	1993	1.03	1956	93.8	137
August	635	1993	1.16	1956	60.4	107
September	341	1986	1.21	1950	40.2	69.0
Annual	299	1993	2.84	1956	79.3	55.0

Graph of annual mean discharges for period of record 1950-96



05451700 TIMBER CREEK NEAR MARSHALLTOWN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1950-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.60	0.90	0.33	0.04	0.30	3.2	1.8	2.0	0.60	0.26	0.46	0.70	0.40
95	1.2	1.4	0.50	0.40	1.1	4.6	5.2	4.4	3.0	1.8	1.8	1.4	1.5
90	1.8	2.3	1.2	0.70	2.9	7.9	8.3	8.3	8.6	5.8	3.3	2.1	3.0
85	2.9	3.1	2.2	2.1	4.1	13	13	14	15	9.4	4.7	2.7	4.4
80	3.6	4.0	3.2	3.2	5.6	18	19	21	20	14	6.5	3.6	6.3
75	4.4	5.0	4.7	4.0	7.0	25	26	29	28	17	7.9	4.4	8.5
70	5.3	6.3	6.0	5.5	9.0	29	33	36	34	21	10	5.9	11
60	9.2	11	9.0	8.2	25	42	46	51	54	30	14	9.1	20
50	15	19	15	15	34	56	62	74	76	44	22	14	32
40	22	30	25	32	41	77	83	95	98	58	28	20	45
30	35	40	47	40	56	108	111	127	128	77	38	28	65
25	43	50	53	45	64	130	136	151	149	88	45	33	78
20	54	65	60	52	80	168	161	181	172	104	55	41	96
15	69	82	69	62	109	223	197	216	206	127	69	56	123
10	98	101	83	75	160	314	249	280	266	162	98	84	173
5	155	149	112	100	350	641	354	382	419	296	210	163	282

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 47 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	650
0.90	1.11	894
0.80	1.25	1,300
0.50	2	2,540
0.20	5	4,740
0.10	10	6,440
0.04	25	8,810
0.02	50	10,700
0.01	100	12,700
0.005	200	14,700

Magnitude and frequency of annual high discharges, based on period of record 1950-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	63	34	19	13
0.95	1.05	178	103	62	42
0.90	1.11	286	170	106	72
0.80	1.25	474	289	185	125
0.50	2	1,020	630	411	281
0.20	5	1,740	1,050	677	477
0.10	10	2,130	1,250	796	571
0.04	25	2,490	1,430	893	654
0.02	50	2,690	1,520	938	695
0.01	100	2,850	1,580	969	724
0.005	200	2,970	1,630	989	744

05451700 TIMBER CREEK NEAR MARSHALLTOWN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1950 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.04	0.17	0.31	0.39	0.55
0.02	50	0.00	0.00	0.00	0.00	0.09	0.29	0.50	0.62	0.88
0.05	20	0.00	0.06	0.07	0.16	0.27	0.64	0.98	1.2	1.7
0.10	10	0.27	0.36	0.43	0.46	0.64	1.2	1.7	2.1	3.0
0.20	5	0.92	0.98	1.1	1.2	1.6	2.5	3.4	4.1	5.9
0.50	2	4.1	4.2	4.6	5.3	7.0	8.7	11	13	19
0.80	1.25	12	13	14	16	20	25	32	37	52
0.90	1.11	20	21	22	25	30	41	54	62	83
0.96	1.04	31	33	35	38	42	64	91	103	134
0.98	1.02	40	43	45	48	50	84	125	140	180
0.99	1.01	49	55	56	57	59	106	164	183	230

Magnitude and frequency of seasonal low discharges, based on period of record October 1949 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.05	0.12	0.33	0.48	0.76
0.02	50	0.00	0.00	0.00	0.13	0.29	0.66	0.92	1.4
0.05	20	0.23	0.24	0.28	0.47	0.96	1.7	2.2	3.2
0.10	10	0.62	0.66	0.78	1.3	2.4	3.7	4.6	6.3
0.20	5	1.6	1.8	2.1	3.6	6.4	8.3	9.9	13
0.50	2	7.6	8.4	9.7	17	26	29	33	44
0.80	1.25	26	29	32	46	65	72	82	109
0.90	1.11	45	51	55	65	87	102	117	158
0.96	1.04	77	88	91	93	108	136	159	221
0.98	1.02	105	115	121	130	118	157	186	264
0.99	1.01	136	150	154	160	126	175	210	304
		July-August-September				October-November-December			
0.01	100	0.00	0.22	0.35	0.68	0.00	0.00	0.15	0.25
0.02	50	0.00	0.34	0.51	0.93	0.00	0.00	0.25	0.40
0.05	20	0.35	0.65	0.88	1.5	0.24	0.30	0.55	0.82
0.10	10	0.97	1.1	1.4	2.3	0.60	0.75	1.1	1.5
0.20	5	1.9	2.2	2.6	3.8	1.5	1.8	2.3	3.1
0.50	2	6.1	7.0	7.8	10	6.4	7.7	8.7	11
0.80	1.25	18	21	23	29	22	25	29	35
0.90	1.11	31	36	41	50	40	44	51	61
0.96	1.04	57	63	75	92	71	76	88	106
0.98	1.02	84	90	110	136	101	104	124	150
0.99	1.01	119	122	155	193	136	137	166	202

05451900 RICHLAND CREEK NEAR HAVEN, IOWA

LOCATION.—Lat 41°53'58", long 92°28'27", in SE1/4 NE1/4 sec. 21, T82N, R14W, Tama County, Hydrologic Unit 07080208, on right bank 5 ft upstream from bridge on county highway, 0.5 mi northeast of Haven, and 3.0 mi upstream from mouth.

DRAINAGE AREA.—56.1 mi^2.

PERIOD OF RECORD.—October 1949 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 788.69 ft above sea level. Prior to October 1, 1971, at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,200 ft^3/s, April 12, 1991, gage height, 26.71 ft; no flow January 23–February 2, 1977, July 9, 10, 1989.

Selected values from rating table number 20, developed September 1992

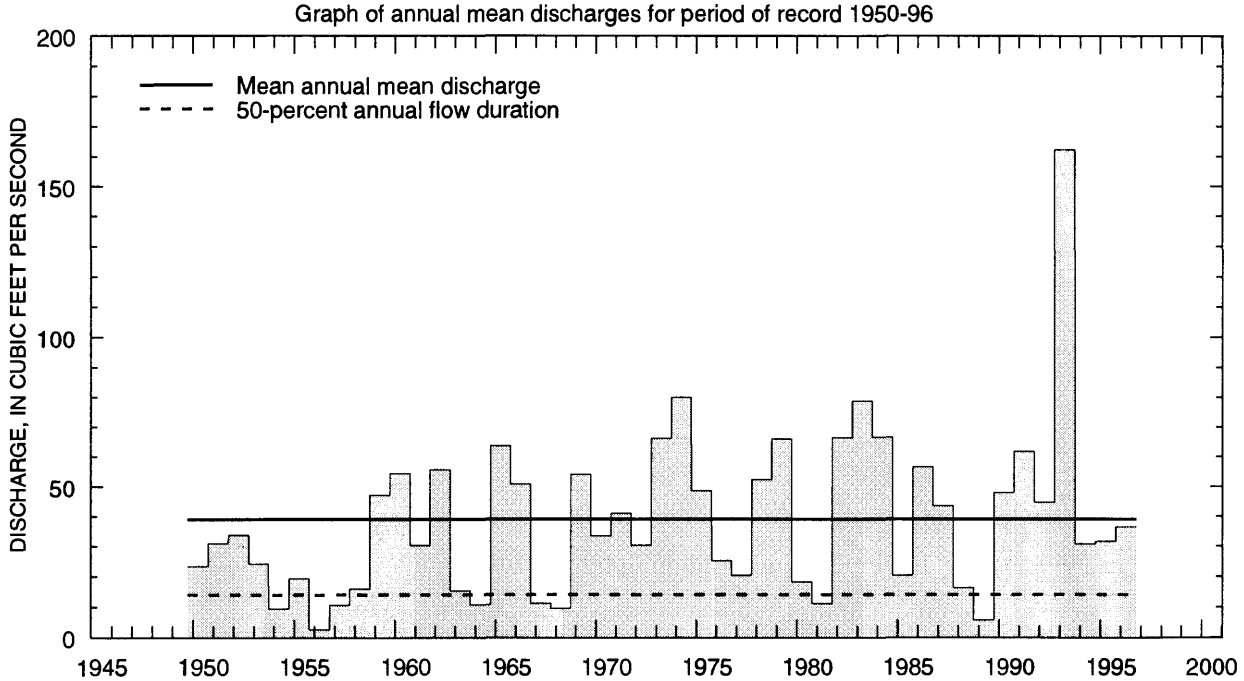
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.5	2.36	15.0	512
10.0	13.5	16.0	663
11.0	72.0	17.0	829
12.0	161	19.0	1,210
13.0	260	21.0	2,350
14.0	378	23.0	5,200

05451900 RICHLAND CREEK NEAR HAVEN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1950-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	105	1987	0.24	1957	17.7	24.2
November	122	1984	0.31	1951	22.5	28.4
December	85.8	1983	0.25	1957	17.5	20.8
January	104	1960	0.020	1977	19.7	23.3
February	165	1965	0.32	1989	42.8	40.6
March	270	1979	1.05	1956	67.7	60.7
April	323	1991	0.85	1956	58.0	61.1
May	337	1974	2.04	1956	60.3	61.4
June	270	1990	0.25	1956	63.7	59.7
July	463	1993	0.66	1977	45.8	73.7
August	427	1993	0.76	1955	32.9	66.7
September	159	1993	0.58	1950	20.6	32.3
Annual	162	1993	2.49	1956	39.0	27.9

Graph of annual mean discharges for period of record 1950-96



05451900 RICHLAND CREEK NEAR HAVEN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1950-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.16	0.20	0.19	0.01	0.08	0.50	0.50	0.40	0.20	0.10	0.30	0.20	0.18
95	0.30	0.45	0.30	0.20	0.30	1.3	1.4	1.1	0.70	0.53	0.70	0.56	0.50
90	0.60	0.80	0.49	0.40	1.0	3.1	4.2	3.8	3.7	2.1	1.0	0.87	1.0
85	1.1	1.1	0.80	1.0	2.1	5.4	8.0	6.3	5.7	3.3	1.7	1.4	2.0
80	1.6	1.7	1.2	1.7	2.7	7.9	10	9.4	7.7	4.6	2.8	2.0	3.1
75	2.1	2.5	2.1	2.1	3.8	10	13	12	11	6.3	3.6	2.7	4.2
70	2.8	3.7	3.0	3.1	5.4	13	15	15	15	8.6	4.3	3.1	5.6
60	4.4	6.1	5.3	5.0	9.6	18	21	21	22	13	6.0	4.3	9.1
50	7.5	9.2	7.9	7.8	13	25	30	33	31	18	8.6	6.2	14
40	10	13	11	12	18	35	41	45	40	24	12	9.2	20
30	15	23	19	17	25	47	56	60	54	32	16	13	29
25	19	29	23	20	29	55	66	71	63	36	20	15	36
20	26	36	27	23	35	68	77	83	74	42	24	18	45
15	34	42	33	28	45	90	94	101	92	51	31	22	57
10	48	51	43	37	78	138	119	127	117	72	44	34	79
5	72	71	59	60	196	260	185	180	197	169	107	94	136

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 47 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	351
0.95	1.05	556
0.90	1.11	710
0.80	1.25	957
0.50	2	1,700
0.20	5	3,010
0.10	10	4,060
0.04	25	5,590
0.02	50	6,870
0.01	100	8,280
0.005	200	9,830

Magnitude and frequency of annual high discharges, based on period of record 1950-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	87	46	25	16
0.95	1.05	155	84	50	32
0.90	1.11	206	114	70	45
0.80	1.25	286	161	102	67
0.50	2	510	292	192	129
0.20	5	848	491	323	225
0.10	10	1,080	625	408	289
0.04	25	1,370	790	508	367
0.02	50	1,580	910	577	422
0.01	100	1,790	1,020	640	473
0.005	200	1,990	1,140	699	522

05451900 RICHLAND CREEK NEAR HAVEN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1950 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.02	0.06	0.11	0.13	0.26
0.02	50	0.00	0.00	0.00	0.00	0.04	0.12	0.20	0.23	0.44
0.05	20	0.01	0.04	0.06	0.08	0.11	0.28	0.43	0.50	0.91
0.10	10	0.08	0.12	0.17	0.22	0.28	0.57	0.82	0.96	1.7
0.20	5	0.29	0.35	0.45	0.56	0.72	1.2	1.7	2.0	3.3
0.50	2	1.6	1.7	1.9	2.3	3.1	4.4	5.7	6.8	10
0.80	1.25	5.2	5.4	5.9	6.8	8.7	12	15	19	26
0.90	1.11	8.3	8.9	9.6	11	13	18	24	30	40
0.96	1.04	12	14	15	17	17	26	36	47	60
0.98	1.02	15	18	20	21	25	32	46	61	76
0.99	1.01	18	21	24	26	30	37	56	75	92

Magnitude and frequency of seasonal low discharges, based on period of record October 1949 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.02	0.03	0.11	0.15	0.27
0.02	50	0.00	0.00	0.00	0.05	0.08	0.23	0.30	0.52
0.05	20	0.09	0.10	0.12	0.21	0.28	0.61	0.81	1.3
0.10	10	0.26	0.30	0.34	0.61	0.74	1.3	1.8	2.7
0.20	5	0.73	0.83	0.95	1.8	2.1	3.1	4.1	5.9
0.50	2	3.4	3.8	4.3	8.4	9.7	12	15	20
0.80	1.25	11	12	14	21	27	30	35	48
0.90	1.11	18	20	22	27	39	43	49	67
0.96	1.04	28	31	34	35	52	58	64	89
0.98	1.02	36	39	43	46	60	67	73	104
0.99	1.01	44	48	52	57	66	75	80	115
		July-August-September				October-November-December			
0.01	100	0.00	0.05	0.08	0.29	0.03	0.04	0.05	0.10
0.02	50	0.00	0.09	0.13	0.40	0.06	0.08	0.10	0.17
0.05	20	0.06	0.20	0.28	0.65	0.14	0.18	0.23	0.37
0.10	10	0.25	0.39	0.51	1.0	0.28	0.37	0.46	0.70
0.20	5	0.63	0.84	1.0	1.7	0.63	0.82	1.0	1.5
0.50	2	2.5	3.0	3.6	4.7	2.6	3.2	4.0	5.1
0.80	1.25	7.6	9.0	11	13	8.9	10	12	15
0.90	1.11	13	15	18	22	16	18	21	26
0.96	1.04	21	24	30	39	27	30	34	43
0.98	1.02	29	32	41	57	38	40	46	58
0.99	1.01	38	40	54	79	51	52	59	75

05452000 SALT CREEK NEAR ELBERON, IOWA

LOCATION.—Lat 41°57'51", long 92°18'47", in NW1/4 NW1/4 sec. 36, T83N, R13W, Tama County, Hydrologic Unit 07080208, on left bank 20 ft upstream from bridge on U.S. Highway 30, 2.0 mi upstream from Hog Run, 3.0 mi south of Elberon, and 9.0 mi upstream from mouth.

DRAINAGE AREA.—201 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 781.58 ft above sea level (Iowa Highway Commission bench mark). Prior to October 15, 1945 and June 14, 1947 to February 10, 1949, nonrecording gage on upstream side of bridge.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 41,800 ft^3/s, July 9, 1993, gage height, 20.85 ft; minimum daily discharge, 0.85 ft^3/s, January 31, 1977.

Selected values from rating table number 18, developed July 1993

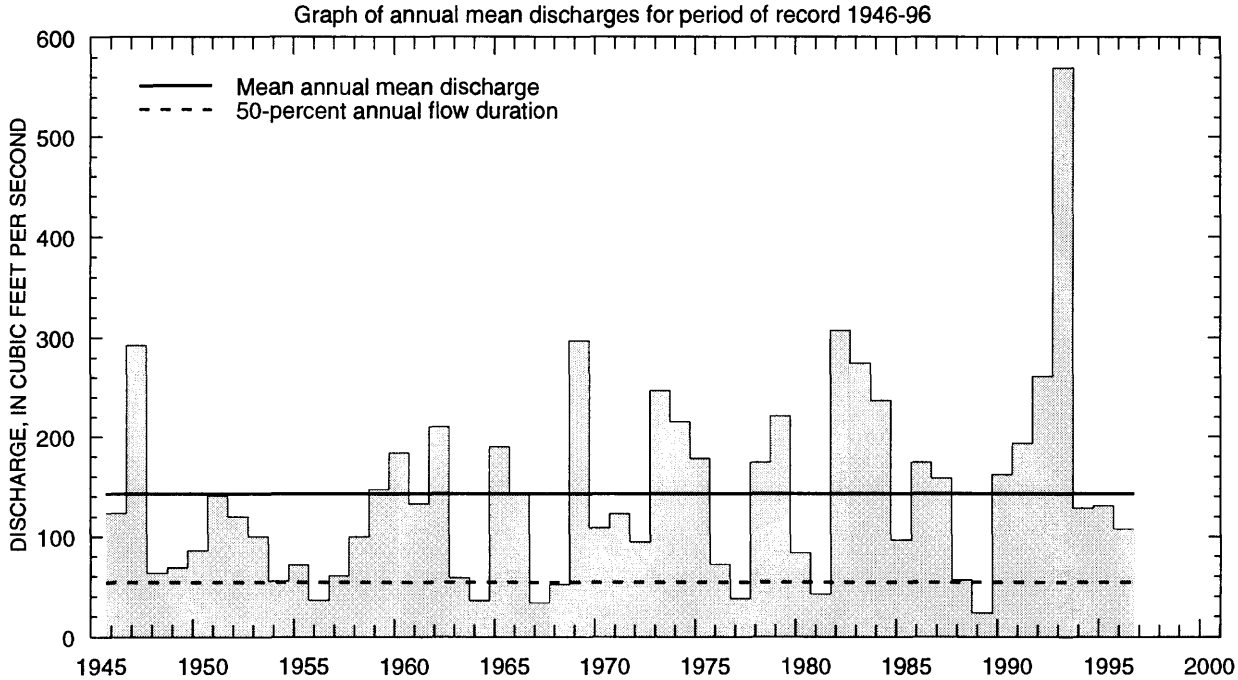
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	11.6	10.0	570
5.5	35.8	12.0	939
6.0	69.7	14.0	1,450
7.0	160	16.0	2,820
8.0	276	18.0	8,950
9.0	413	21.0	39,000

05452000 SALT CREEK NEAR ELBERON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	250	1978	4.85	1951	64.2	69.3
November	425	1983	4.08	1951	80.3	88.9
December	314	1983	2.29	1977	65.2	70.8
January	337	1973	1.14	1977	73.7	80.8
February	607	1982	7.02	1977	140	127
March	844	1993	11.7	1954	271	218
April	652	1983	11.0	1989	194	176
May	573	1982	5.75	1977	195	149
June	1,826	1947	7.79	1977	257	313
July	1,803	1993	3.84	1989	197	337
August	1,157	1993	5.65	1949	106	173
September	440	1993	5.43	1950	69.8	85.2
Annual	569	1993	23.2	1989	143	98.0

Graph of annual mean discharges for period of record 1946-96



05452000 SALT CREEK NEAR ELBERON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	4.4	3.8	1.8	1.2	3.0	7.8	8.0	5.2	3.7	3.0	3.5	3.6	3.2
95	5.6	6.1	3.8	3.3	5.8	12	13	16	11	7.3	6.4	5.5	5.9
90	7.5	7.5	4.7	4.4	8.6	18	27	28	19	11	8.9	7.4	8.8
85	8.8	9.0	6.6	6.4	11	30	33	36	25	15	12	9.8	12
80	11	12	8.3	8.0	15	40	41	42	34	20	15	12	16
75	14	15	12	11	20	49	51	53	45	25	18	14	21
70	16	18	15	15	25	57	62	61	60	31	20	17	27
60	25	30	25	26	39	74	81	80	82	44	26	20	40
50	36	44	33	36	47	98	106	110	110	63	32	27	54
40	48	56	48	46	65	140	140	148	146	85	44	40	74
30	60	82	70	62	88	196	190	213	198	117	59	53	106
25	68	103	84	71	108	220	226	240	228	139	70	63	130
20	84	122	100	82	125	265	268	276	272	169	86	74	161
15	111	144	121	109	179	365	322	328	349	212	120	90	207
10	153	180	155	143	270	551	409	411	478	325	181	124	281
5	222	246	200	209	500	1,300	600	596	831	673	404	288	476

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 52 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	714
0.95	1.05	1,220
0.90	1.11	1,620
0.80	1.25	2,320
0.50	2	4,680
0.20	5	9,680
0.10	10	14,300
0.04	25	21,800
0.02	50	28,800
0.01	100	37,100
0.005	200	46,900

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	289	163	111	68
0.95	1.05	529	307	197	125
0.90	1.11	714	418	265	170
0.80	1.25	1,010	595	372	243
0.50	2	1,840	1,090	683	458
0.20	5	3,110	1,820	1,190	816
0.10	10	3,980	2,300	1,550	1,080
0.04	25	5,070	2,890	2,040	1,430
0.02	50	5,860	3,310	2,410	1,700
0.01	100	6,630	3,710	2,790	1,970
0.005	200	7,390	4,080	3,170	2,250

05452000 SALT CREEK NEAR ELBERON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.76	0.80	0.84	0.90	1.1	1.4	1.8	2.1	2.7
0.02	50	1.1	1.1	1.2	1.3	1.5	2.0	2.5	3.0	4.0
0.05	20	1.7	1.8	1.9	2.1	2.5	3.3	4.1	4.8	6.7
0.10	10	2.6	2.7	2.9	3.2	3.8	5.0	6.3	7.3	10
0.20	5	4.1	4.3	4.7	5.3	6.3	8.3	10	12	17
0.50	2	9.6	10	11	12	15	20	25	29	42
0.80	1.25	21	22	23	26	32	44	56	67	92
0.90	1.11	30	32	34	37	46	64	84	101	132
0.96	1.04	44	46	49	53	67	94	125	155	189
0.98	1.02	55	58	61	65	83	118	160	202	235
0.99	1.01	67	71	74	78	100	143	199	254	282

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.72	0.80	0.87	1.2	2.5	2.9	3.4	4.8
0.02	50	1.1	1.2	1.4	1.8	3.6	4.1	4.8	6.9
0.05	20	2.0	2.2	2.5	3.5	6.0	6.9	8.2	11
0.10	10	3.3	3.8	4.3	6.0	9.3	11	13	18
0.20	5	5.9	6.8	7.7	11	15	18	21	29
0.50	2	17	19	21	31	38	44	52	70
0.80	1.25	41	47	52	73	84	97	114	154
0.90	1.11	63	73	78	106	124	142	166	223
0.96	1.04	96	112	116	153	181	206	241	323
0.98	1.02	123	145	147	188	229	258	302	404
0.99	1.01	153	181	190	224	279	313	366	490
		July-August-September				October-November-December			
0.01	100	2.0	2.4	2.8	3.4	0.81	0.97	1.1	1.5
0.02	50	2.4	2.9	3.3	4.1	1.2	1.4	1.7	2.2
0.05	20	3.3	3.9	4.4	5.5	2.1	2.5	2.9	3.8
0.10	10	4.3	5.1	5.7	7.2	3.4	4.1	4.8	6.0
0.20	5	6.3	7.3	8.1	10	5.8	7.1	8.2	10
0.50	2	13	15	17	21	16	19	21	26
0.80	1.25	30	34	38	50	37	43	49	60
0.90	1.11	47	54	61	80	57	65	73	90
0.96	1.04	77	89	104	138	88	96	108	133
0.98	1.02	108	126	149	199	114	122	136	169
0.99	1.01	147	174	208	281	142	150	166	207

05452200 WALNUT CREEK NEAR HARTWICK, IOWA

LOCATION.—Lat 41°50'06", long 92°23'10", in SE1/4 SW1/4 sec. 8, T81N, R13W, Poweshiek County, Hydrologic Unit 07080208, on right bank 5 ft downstream from bridge on County Highway V21, 1.2 mi downstream from North Walnut Creek, 4.0 mi northwest of Hartwick, and 6.5 mi upstream from mouth

DRAINAGE AREA.—70.9 mi^2.

PERIOD OF RECORD.—October 1949 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 786.59 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 7,900 ft^3/s, April 29, 1991, gage height, 16.93 ft; no flow many days in 1954, 1955, 1956, 1957, and 1977.

Selected values from rating table number 16, developed March 1991

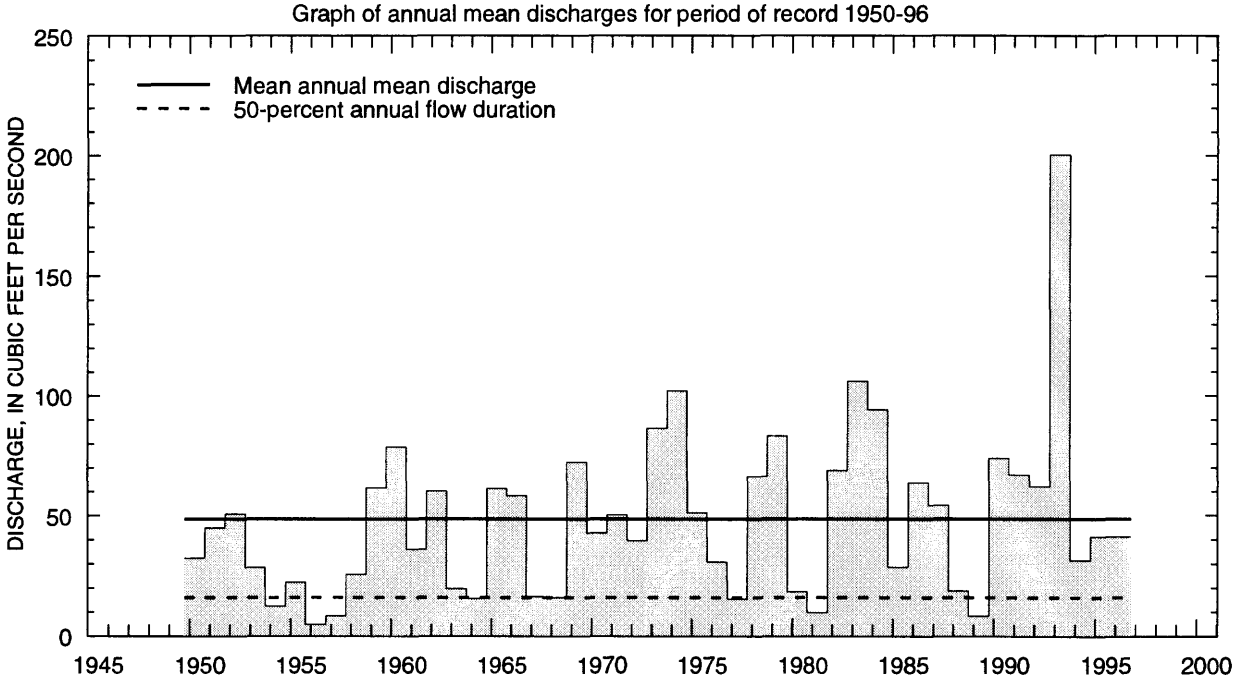
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	5.70	8.0	633
3.5	32.0	9.0	835
4.0	66.0	11.0	1,300
5.0	165	13.0	1,970
6.0	300	15.0	4,140
7.0	455	17.0	8,050

05452200 WALNUT CREEK NEAR HARTWICK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1950-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	137	1987	0.003	1957	19.1	30.0
November	171	1984	0.29	1956	27.7	37.8
December	109	1993	0.060	1977	23.4	28.9
January	179	1960	0.006	1956	26.2	33.8
February	191	1971	1.40	1954	50.0	44.6
March	300	1993	1.64	1954	83.0	75.8
April	365	1991	1.03	1957	77.0	78.8
May	452	1974	1.62	1977	78.5	83.7
June	450	1990	0.76	1956	79.3	83.7
July	461	1993	1.01	1954	55.9	86.7
August	498	1993	0.38	1955	37.0	76.2
September	185	1993	0.28	1953	25.9	41.2
Annual	200	1993	4.76	1956	48.5	35.0

Graph of annual mean discharges for period of record 1950-96



05452200 WALNUT CREEK NEAR HARTWICK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1950-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.10	0.01	0.00	0.00	0.50	0.10	0.33	0.10	0.10	0.08	0.00	0.00
95	0.20	0.30	0.10	0.10	0.40	2.2	1.4	1.6	1.0	0.54	0.43	0.20	0.36
90	0.66	0.80	0.32	0.27	1.5	4.7	4.8	3.9	3.5	1.8	0.93	0.84	1.1
85	0.95	1.4	0.69	0.90	2.7	6.7	7.9	7.0	6.7	3.6	1.8	1.3	2.0
80	1.4	1.9	1.4	1.8	4.2	9.5	10	11	10	5.3	2.5	1.6	3.1
75	1.7	2.2	2.4	2.9	5.9	12	14	16	13	6.9	3.3	2.0	4.4
70	2.2	2.9	3.4	3.7	8.0	16	17	19	16	9.0	3.9	2.7	6.0
60	3.8	6.4	6.2	6.2	12	23	27	30	25	13	5.9	4.0	10
50	6.5	9.2	9.7	10	18	33	39	41	35	19	8.8	6.2	16
40	9.2	15	16	15	24	44	56	55	47	25	12	9.5	24
30	14	26	24	25	32	60	71	79	65	34	17	14	36
25	18	32	32	29	40	73	83	92	75	40	21	17	44
20	24	41	40	34	48	88	100	108	90	47	28	22	56
15	32	55	46	40	64	120	121	129	109	60	36	29	73
10	49	68	58	51	109	170	162	168	140	94	55	46	102
5	90	97	80	78	205	321	262	243	236	212	130	115	171

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 47 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	356
0.95	1.05	685
0.90	1.11	949
0.80	1.25	1,380
0.50	2	2,650
0.20	5	4,720
0.10	10	6,190
0.04	25	8,100
0.02	50	9,530
0.01	100	10,900
0.005	200	12,300

Magnitude and frequency of annual high discharges, based on period of record 1950-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	97	65	41	25
0.95	1.05	180	112	73	46
0.90	1.11	245	148	97	62
0.80	1.25	349	206	135	88
0.50	2	649	378	242	165
0.20	5	1,120	667	412	288
0.10	10	1,460	885	533	376
0.04	25	1,890	1,180	691	490
0.02	50	2,210	1,420	810	577
0.01	100	2,520	1,660	929	663
0.005	200	2,840	1,920	1,050	750

05452200 WALNUT CREEK NEAR HARTWICK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1950 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.10	0.26
0.02	50	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.17	0.44
0.05	20	0.00	0.00	0.00	0.00	0.00	0.09	0.26	0.41	0.92
0.10	10	0.00	0.00	0.03	0.06	0.16	0.26	0.57	0.83	1.7
0.20	5	0.24	0.26	0.30	0.38	0.55	0.80	1.3	1.8	3.5
0.50	2	1.5	1.6	1.8	2.0	2.6	4.3	5.5	7.1	12
0.80	1.25	5.1	5.4	6.0	6.6	8.2	13	17	21	32
0.90	1.11	8.7	9.1	10	11	14	20	28	35	50
0.96	1.04	14	15	16	18	23	27	43	56	77
0.98	1.02	19	19	21	24	31	35	56	74	100
0.99	1.01	24	25	26	31	40	50	68	93	124

Magnitude and frequency of seasonal low discharges, based on period of record October 1949 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37
0.05	20	0.00	0.02	0.03	0.12	0.09	0.14	0.43	1.1
0.10	10	0.15	0.23	0.27	0.84	0.81	1.2	1.4	2.4
0.20	5	0.70	0.83	1.0	2.5	2.6	3.5	4.2	6.0
0.50	2	4.3	4.9	5.9	10	11	14	18	24
0.80	1.25	15	17	19	26	29	35	44	62
0.90	1.11	24	29	31	38	40	47	59	90
0.96	1.04	38	46	48	53	53	61	73	121
0.98	1.02	49	59	61	70	61	68	81	141
0.99	1.01	60	72	74	78	67	75	87	157
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00
0.05	20	0.00	0.03	0.06	0.39	0.01	0.04	0.06	0.15
0.10	10	0.14	0.18	0.28	0.71	0.10	0.13	0.21	0.41
0.20	5	0.49	0.56	0.73	1.4	0.38	0.47	0.65	1.1
0.50	2	2.4	2.8	3.1	4.9	2.4	2.9	3.6	5.1
0.80	1.25	8.0	9.5	11	15	9.4	11	13	17
0.90	1.11	14	16	19	26	17	19	23	30
0.96	1.04	23	27	35	46	30	31	37	49
0.98	1.02	31	37	51	64	40	42	49	65
0.99	1.01	40	47	70	86	53	57	62	83

05452500 IOWA RIVER NEAR BELLE PLAINE, IOWA

LOCATION.—Lat 41°51'30", long 92°16'39", in SW1/4 NW1/4 sec. 5, T81N, R12W, Iowa County, Hydrologic Unit 07080208, on right bank 5 ft downstream from bridge on State Highway 212, 1.0 mi downstream from Salt Creek, 1.1 mi downstream from Walnut Creek and 2.7 mi south of Belle Plaine.

DRAINAGE AREA.—2,455 mi^2.

PERIOD OF RECORD.—September 1939 to September 1959 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 749.82 ft above sea level. Prior to March 13, 1940, wire-weight at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 34,000 ft^3/s, June 14, 1947, gage height, 17.07 ft; minimum daily discharge, 19 ft^3/s, January 6, 1940.

Selected values from rating table number 1, developed October 1956
(A discharge measurement to validate this rating has not been made since September 1959)

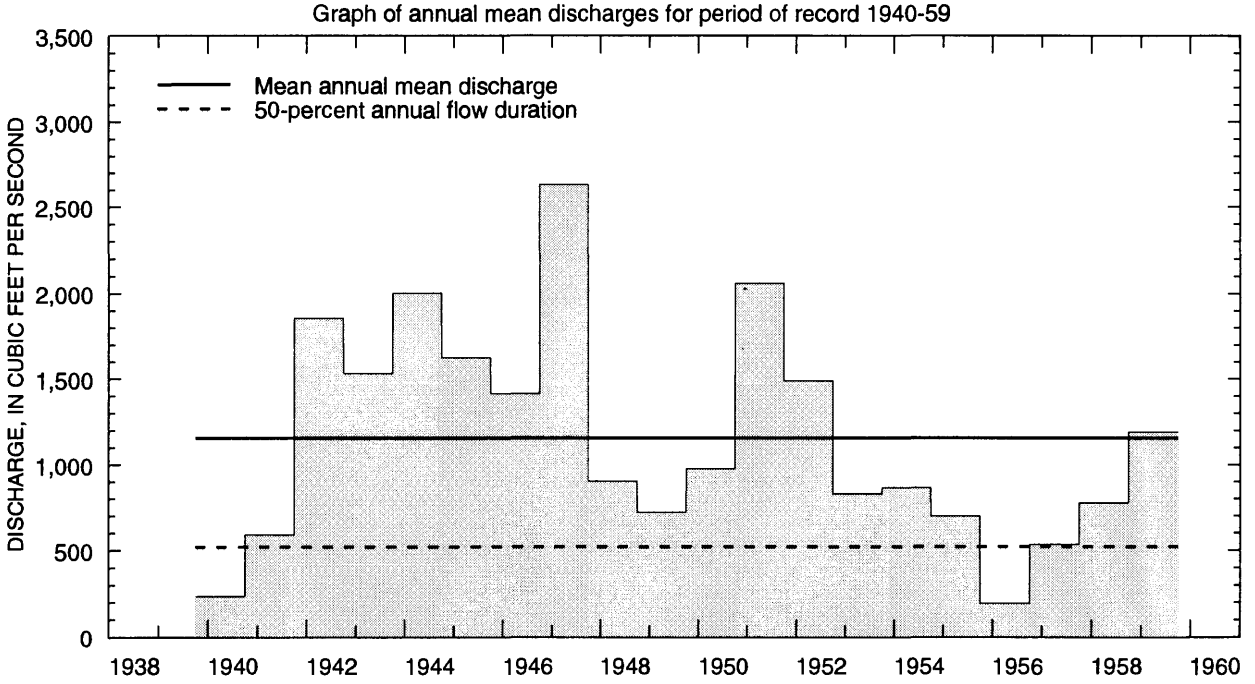
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	72	10.0	2,470
4.7	120	11.0	3,290
5.0	192	12.0	4,400
5.5	327	13.0	5,900
6.0	486	14.0	8,350
7.0	850	15.0	14,100
8.0	1,290	16.0	23,000
9.0	1,820		

05452500 IOWA RIVER NEAR BELLE PLAINE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1940-59

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,837	1955	71.8	1940	488	545
November	2,742	1942	82.8	1956	513	629
December	1,081	1942	51.2	1956	313	257
January	3,170	1946	27.1	1940	514	721
February	2,497	1943	33.6	1940	885	642
March	5,075	1959	193	1954	2,308	1,592
April	6,320	1951	229	1957	1,752	1,518
May	7,495	1944	311	1940	1,711	1,609
June	14,950	1947	138	1956	2,838	3,286
July	3,901	1947	104	1940	1,291	1,040
August	1,884	1943	99.5	1949	699	557
September	1,654	1942	83.7	1955	576	490
Annual	2,634	1947	195	1956	1,156	651

Graph of annual mean discharges for period of record 1940-59



05452500 IOWA RIVER NEAR BELLE PLAINE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1940-59

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	58	60	45	24	27	101	146	185	81	56	76	60	41
95	68	78	60	37	37	186	204	238	154	94	96	78	72
90	74	84	76	47	47	267	296	295	239	188	116	90	89
85	81	88	80	55	99	350	429	353	372	257	139	102	120
80	89	95	85	70	115	473	554	413	470	338	163	112	159
75	102	110	91	80	145	632	691	473	660	417	198	140	200
70	120	133	113	125	190	810	766	590	858	486	246	176	245
60	154	185	170	190	250	1,180	1,010	1,020	1,190	665	323	229	368
50	256	284	220	240	330	1,590	1,220	1,270	1,690	869	416	320	520
40	373	373	300	310	652	2,020	1,460	1,520	2,180	1,190	537	495	770
30	449	516	400	420	1,100	2,680	1,780	1,870	2,830	1,440	712	632	1,150
25	562	640	442	500	1,350	3,010	2,180	2,050	3,440	1,640	810	723	1,370
20	746	776	480	560	1,500	3,460	2,740	2,290	4,000	1,880	955	862	1,640
15	1,020	925	550	696	1,750	4,030	3,090	2,640	4,780	2,200	1,090	1,080	2,060
10	1,340	1,150	700	948	2,220	5,020	3,630	3,540	6,570	2,510	1,490	1,290	2,710
5	1,810	1,620	870	1,690	3,070	7,890	5,500	4,400	9,620	4,000	2,400	1,750	4,160

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 61 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,190
0.95	1.05	3,720
0.90	1.11	4,860
0.80	1.25	6,640
0.50	2	11,600
0.20	5	19,300
0.10	10	24,800
0.04	25	31,800
0.02	50	37,100
0.01	100	42,500
0.005	200	47,800

[a] Analysis includes area-weighted peak discharges (1960-96) computed from station 05453100 Iowa River at Marengo.

Magnitude and frequency of annual high discharges, based on period of record 1940-59

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	872	566	412	328
0.95	1.05	1,810	1,310	940	741
0.90	1.11	2,600	1,960	1,400	1,100
0.80	1.25	3,920	3,070	2,190	1,710
0.50	2	7,950	6,390	4,610	3,570
0.20	5	14,600	11,500	8,490	6,550
0.10	10	19,400	14,800	11,100	8,560
0.04	25	25,500	18,700	14,300	11,000
0.02	50	29,900	21,300	16,500	12,700
0.01	100	34,300	23,600	18,600	14,300
0.005	200	38,600	25,700	20,500	15,800

05452500 IOWA RIVER NEAR BELLE PLAINE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1959

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	23	23	23	25	28	29	29	31	41
0.02	50	27	28	28	29	33	35	37	40	53
0.05	20	35	36	36	38	43	48	53	58	77
0.10	10	45	45	45	48	55	64	73	80	107
0.20	5	59	59	61	65	74	90	105	119	158
0.50	2	103	104	109	117	135	171	212	245	324
0.80	1.25	184	188	201	219	252	324	414	489	646
0.90	1.11	251	258	281	308	354	452	581	693	916
0.96	1.04	352	365	404	447	512	645	829	996	1,320
0.98	1.02	440	458	514	572	654	810	1,040	1,250	1,660
0.99	1.01	539	564	641	718	818	995	1,270	1,530	2,040

Magnitude and frequency of seasonal low discharges, based on period of record October 1939 to September 1959

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	13	14	16	39	46	53	68
0.02	50	17	18	19	21	54	63	71	92
0.05	20	27	28	29	34	85	98	111	143
0.10	10	39	40	42	51	125	145	163	210
0.20	5	61	63	67	84	197	226	256	330
0.50	2	132	144	153	216	448	509	579	758
0.80	1.25	259	314	343	558	961	1,070	1,250	1,670
0.90	1.11	354	465	516	915	1,400	1,550	1,820	2,480
0.96	1.04	483	697	790	1,550	2,050	2,250	2,680	3,730
0.98	1.02	581	899	1,040	2,170	2,600	2,830	3,420	4,820
0.99	1.01	680	1,130	1,320	2,950	3,210	3,470	4,240	6,060
		July-August-September				October-November-December			
0.01	100	22	25	29	37	28	30	31	31
0.02	50	28	31	36	45	33	35	36	37
0.05	20	40	43	50	61	42	44	46	49
0.10	10	55	59	67	82	54	56	59	64
0.20	5	81	86	97	118	72	75	79	90
0.50	2	170	182	203	251	130	142	152	180
0.80	1.25	361	396	442	578	244	290	315	389
0.90	1.11	538	601	674	923	346	438	477	599
0.96	1.04	825	945	1,070	1,560	507	696	764	970
0.98	1.02	1,090	1,270	1,460	2,210	654	954	1,050	1,340
0.99	1.01	1,400	1,670	1,930	3,060	826	1,280	1,420	1,810

05453000 BIG BEAR CREEK AT LADORA, IOWA

LOCATION.—Lat 41°44'58", long 92°10'55", in SW1/4 SW1/4 sec. 7, T80N, R11W, Iowa County, Hydrologic Unit 07080208, on left bank 10 ft downstream from bridge on County Highway V52, 0.4 mi south of Ladora, 1.2 mi downstream from Coats Creek, 2.8 mi upstream from Little Bear Creek, and 8.1 mi upstream from mouth.

DRAINAGE AREA.—189 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996. Prior to October 1966, published as Bear Creek at Ladora.

GAGE.—Water-stage recorder. Datum of gage is 744.94 ft above sea level. October 1945 to June 26, 1946, nonrecording gage and June 27, 1946 to September 30, 1980, water-stage recorder at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,500 ft^3/s, March 30, 1960; maximum gage height, 15.32 ft (then current datum), September 8, 1977; no flow January 22 to February 8, 1956, January 19 to February 3, 1977.

Selected values from rating table number 16, developed October 1987

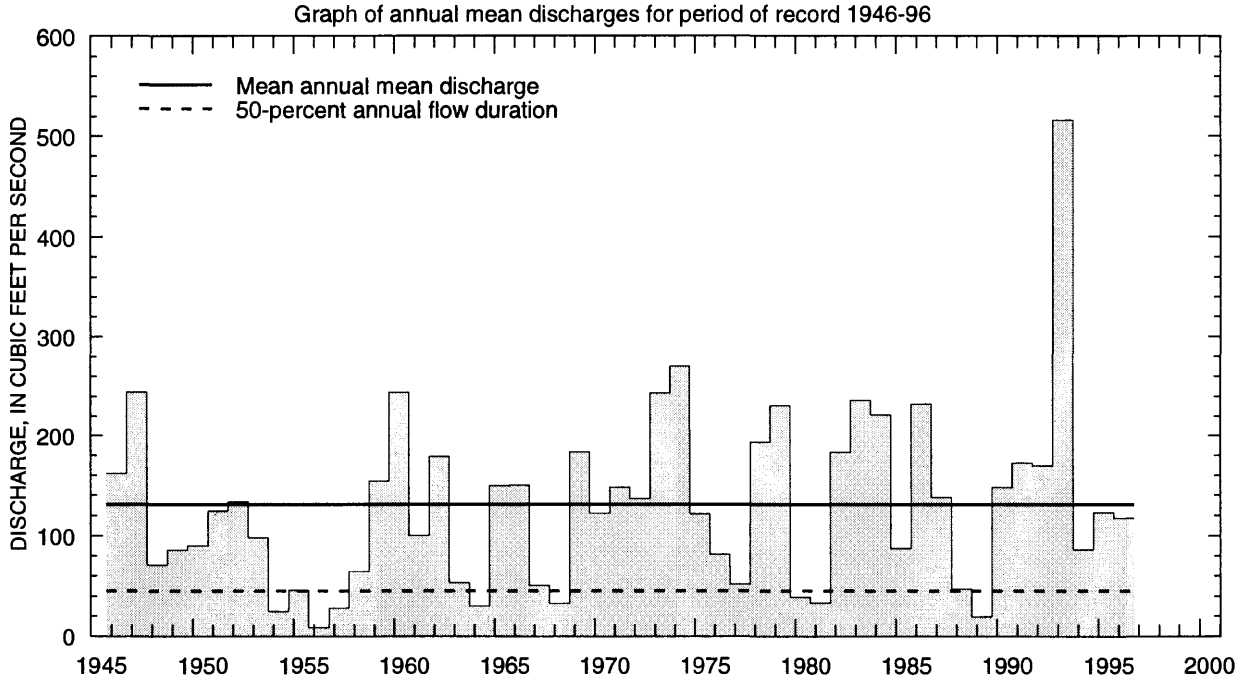
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
10.0	0.58	18.0	2,050
10.5	10.4	20.0	3,000
11.0	38.0	22.0	4,100
12.0	160	24.0	6,000
14.0	590	24.5	6,720
16.0	1,250		

05453000 BIG BEAR CREEK AT LADORA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	375	1987	0.49	1957	57.5	84.6
November	341	1993	1.68	1956	74.7	91.9
December	294	1983	0.33	1956	64.2	74.1
January	432	1960	0.021	1977	74.9	96.2
February	543	1971	2.07	1977	119	110
March	895	1979	5.99	1957	235	204
April	704	1973	4.17	1956	199	185
May	1,185	1974	2.25	1956	210	214
June	1,136	1947	2.94	1956	220	223
July	1,011	1993	5.00	1988	142	183
August	1,537	1993	2.36	1955	95.0	222
September	559	1993	1.34	1956	77.6	127
Annual	516	1993	8.26	1956	131	89.9

Graph of annual mean discharges for period of record 1946-96



05453000 BIG BEAR CREEK AT LADORA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.48	1.4	0.26	0.00	0.02	4.9	2.4	1.6	0.50	2.1	1.4	0.50	0.46
95	2.8	2.9	0.70	0.70	2.0	9.2	6.9	6.8	7.1	4.5	2.7	3.0	2.7
90	3.8	4.6	1.8	1.5	4.9	14	18	16	14	8.9	5.3	4.1	5.0
85	4.7	6.0	3.7	2.4	7.4	22	28	24	22	15	7.4	5.0	7.4
80	5.5	7.3	6.0	6.2	11	33	37	33	30	20	9.2	6.0	10
75	6.5	8.8	8.8	9.8	15	42	45	42	36	25	11	7.3	14
70	7.6	12	12	11	21	52	52	51	46	29	13	8.6	19
60	11	19	18	18	31	75	73	80	71	41	18	12	30
50	18	27	29	30	47	98	105	117	101	55	24	16	45
40	28	43	46	41	62	133	148	160	141	73	30	24	68
30	43	70	72	62	86	181	200	209	197	100	42	36	100
25	58	87	85	72	100	207	228	238	228	118	51	47	126
20	75	120	105	88	125	262	270	277	269	138	67	62	158
15	99	149	128	108	160	337	330	339	338	178	93	81	203
10	148	184	158	145	230	496	428	448	442	266	134	142	278
5	247	269	223	220	500	965	673	701	723	560	273	337	478

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 51 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,840
0.90	1.11	2,270
0.80	1.25	2,890
0.50	2	4,370
0.20	5	6,220
0.10	10	7,330
0.04	25	8,580
0.02	50	9,420
0.01	100	10,200
0.005	200	10,900

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	218	110	71	45
0.95	1.05	441	237	152	99
0.90	1.11	619	343	220	144
0.80	1.25	902	518	332	219
0.50	2	1,680	1,020	651	438
0.20	5	2,770	1,760	1,120	770
0.10	10	3,450	2,230	1,420	987
0.04	25	4,210	2,770	1,760	1,240
0.02	50	4,720	3,130	1,990	1,420
0.01	100	5,170	3,460	2,190	1,580
0.005	200	5,580	3,760	2,380	1,720

05453000 BIG BEAR CREEK AT LADORA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.11	0.30	0.64	1.3
0.02	50	0.00	0.00	0.00	0.00	0.00	0.23	0.55	1.0	2.0
0.05	20	0.15	0.15	0.15	0.20	0.30	0.65	1.3	2.0	3.7
0.10	10	0.60	0.61	0.67	0.81	0.88	1.5	2.5	3.6	6.1
0.20	5	1.5	1.6	1.7	2.0	2.4	3.6	5.3	6.9	11
0.50	2	5.7	6.0	6.6	7.5	9.9	14	18	22	32
0.80	1.25	15	16	18	20	26	37	47	58	83
0.90	1.11	24	25	27	30	38	52	71	93	134
0.96	1.04	36	38	39	44	51	70	103	146	215
0.98	1.02	46	48	49	55	60	81	127	192	289
0.99	1.01	56	58	59	66	67	90	149	242	373

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.31	0.48	0.76	1.2
0.02	50	0.00	0.00	0.00	0.00	0.68	0.97	1.5	2.2
0.05	20	0.24	0.29	0.32	0.60	1.9	2.6	3.6	5.2
0.10	10	1.1	1.2	1.4	2.1	4.4	5.5	7.2	10
0.20	5	2.9	3.2	3.8	6.4	10	12	16	21
0.50	2	13	14	16	29	37	42	51	69
0.80	1.25	40	43	48	73	85	98	117	164
0.90	1.11	66	73	78	98	113	134	160	233
0.96	1.04	108	119	124	130	140	170	208	314
0.98	1.02	143	160	162	170	155	191	237	368
0.99	1.01	182	205	207	210	165	208	262	416
		July-August-September				October-November-December			
0.01	100	0.22	0.27	0.48	1.3	0.07	0.08	0.12	0.23
0.02	50	0.37	0.45	0.71	1.7	0.14	0.16	0.23	0.43
0.05	20	0.78	0.92	1.3	2.5	0.37	0.44	0.59	1.0
0.10	10	1.4	1.7	2.1	3.6	0.83	0.99	1.3	2.1
0.20	5	2.9	3.3	3.8	5.7	2.0	2.4	3.0	4.6
0.50	2	9.1	10	11	14	9.0	11	13	18
0.80	1.25	24	27	31	41	29	34	40	53
0.90	1.11	37	42	52	72	49	56	67	86
0.96	1.04	55	65	88	138	79	87	107	135
0.98	1.02	70	82	122	213	103	112	139	176
0.99	1.01	85	101	163	319	127	136	173	219

05453100 IOWA RIVER AT MARENGO, IOWA

LOCATION.—Lat 41°48'48", long 92°03'51", in SE1/4 NE1/4 sec. 24, T81N, R11W, Iowa County, Hydrologic Unit 07080208, on left bank 5 ft upstream from bridge on County Highway V66, 1.0 mi downstream from Big Bear Creek, 0.8 mi north of Marengo, 4.6 mi upstream from Hilton Creek, and at mile 139.1.

DRAINAGE AREA.—2,794 mi^2.

PERIOD OF RECORD.—October 1956 to September 1996. Monthly discharge only for some periods, published in WSP 1728.

GAGE.—Water-stage recorder. Datum of gage is 720.52 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 38,000 ft^3/s, July 19, 1993, gage height, 20.31 ft; minimum daily discharge, 24 ft^3/s, January 29, 1977.

Selected values from rating table number 23, developed April 1995

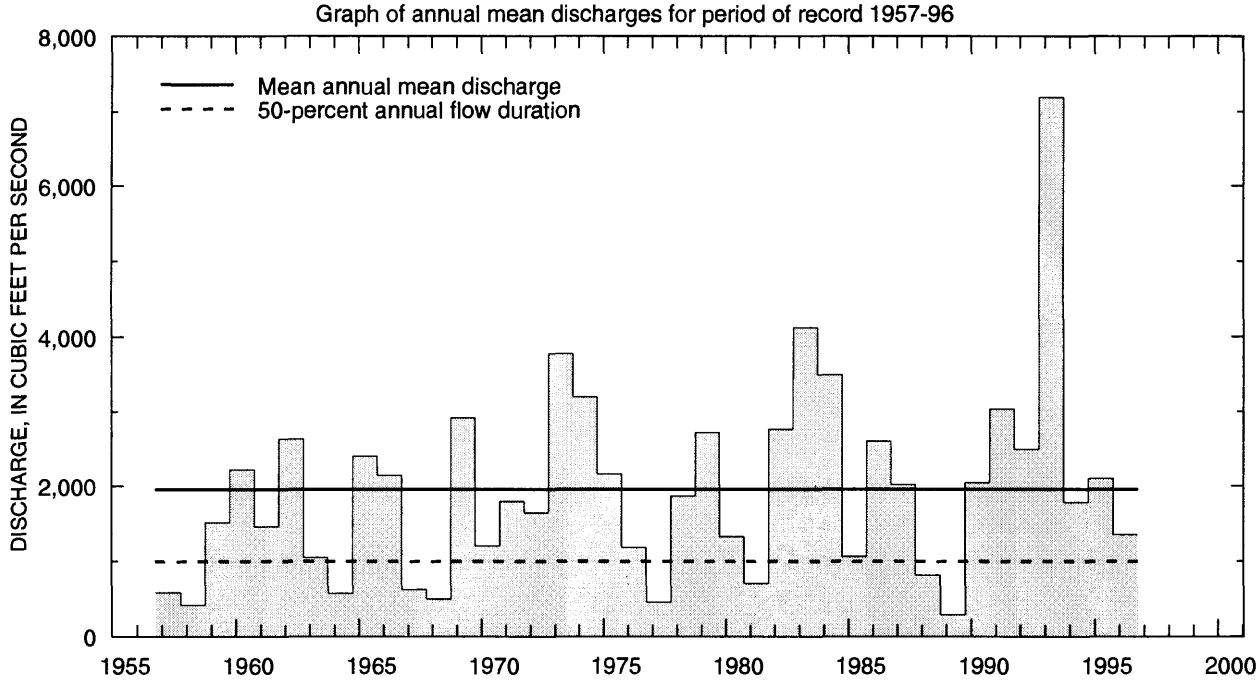
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	310	11.0	3,410
6.0	729	13.0	4,730
7.0	1,200	15.0	7,050
8.0	1,710	18.0	18,300
9.0	2,260	19.5	28,000
10.0	2,820	21.0	41,000

05453100 IOWA RIVER AT MARENGO, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1957-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	5,078	1987	80.8	1957	1,044	1,116
November	3,878	1973	90.0	1957	1,171	1,048
December	3,633	1983	63.0	1990	980	899
January	4,194	1973	31.3	1977	855	891
February	5,424	1984	79.0	1977	1,365	1,270
March	8,227	1979	256	1964	3,242	2,182
April	11,310	1993	259	1977	3,363	2,959
May	9,340	1991	179	1977	2,963	2,348
June	9,051	1993	114	1977	3,168	2,461
July	19,620	1993	116	1977	2,638	3,518
August	15,290	1993	108	1989	1,563	2,484
September	7,901	1993	123	1988	1,075	1,359
Annual	7,192	1993	283	1989	1,954	1,305

Graph of annual mean discharges for period of record 1957-96



05453100 IOWA RIVER AT MARENGO, IOWA—Continued

Monthly and annual flow durations, based on period of record 1957-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	73	84	48	28	52	146	224	160	104	85	86	107	73
95	101	117	78	72	135	240	292	255	248	172	170	147	133
90	146	148	99	112	160	332	422	392	382	432	256	202	199
85	177	200	163	165	190	420	605	579	564	537	315	244	262
80	200	259	202	200	210	605	775	796	777	649	364	271	336
75	246	297	260	234	290	840	892	977	1,030	756	414	308	419
70	330	416	309	266	353	1,100	1,180	1,130	1,160	875	462	359	500
60	464	559	452	370	470	1,600	1,630	1,550	1,510	1,110	565	473	705
50	628	766	630	480	690	2,180	2,060	1,990	2,110	1,350	710	574	1,000
40	765	1,060	920	640	920	2,820	2,750	2,520	2,800	1,710	895	732	1,340
30	1,100	1,540	1,240	841	1,150	3,760	3,810	3,560	3,750	2,280	1,160	927	1,890
25	1,310	1,690	1,370	1,030	1,400	4,480	4,490	4,150	4,220	2,590	1,320	1,060	2,250
20	1,610	1,850	1,560	1,250	1,700	5,240	5,300	4,710	4,810	3,090	1,530	1,210	2,760
15	1,980	2,110	1,850	1,500	2,300	6,440	6,460	5,470	5,800	3,910	2,030	1,510	3,600
10	2,440	2,660	2,260	2,000	3,500	7,760	8,090	7,090	7,340	5,740	3,230	2,170	4,900
5	3,610	3,410	2,900	2,640	5,860	10,000	10,700	8,740	10,200	9,690	6,730	4,330	7,390

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 61 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,380
0.95	1.05	4,050
0.90	1.11	5,310
0.80	1.25	7,250
0.50	2	12,700
0.20	5	21,000
0.10	10	26,700
0.04	25	34,200
0.02	50	39,700
0.01	100	45,300
0.005	200	50,800

[a] Analysis includes area-weighted peak discharges (1918, 1940-56) computed from station 05452500 Iowa River near Belle Plaine.

Magnitude and frequency of annual high discharges, based on period of record 1957-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,250	1,110	925	758
0.95	1.05	2,680	2,290	1,820	1,450
0.90	1.11	3,840	3,250	2,540	2,000
0.80	1.25	5,690	4,770	3,700	2,880
0.50	2	10,700	9,030	7,010	5,370
0.20	5	17,400	15,100	12,100	9,150
0.10	10	21,300	18,900	15,400	11,700
0.04	25	25,400	23,200	19,500	14,800
0.02	50	27,900	26,000	22,400	17,000
0.01	100	30,100	28,600	25,200	19,100
0.005	200	32,000	30,900	27,800	21,200

05453100 IOWA RIVER AT MARENGO, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1957 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	25	25	25	26	29	37	46	52	66
0.02	50	34	34	34	35	40	50	62	70	90
0.05	20	52	52	53	56	63	78	95	109	142
0.10	10	74	75	77	81	92	113	138	158	208
0.20	5	111	113	117	125	141	174	213	245	323
0.50	2	223	228	239	258	298	369	457	534	701
0.80	1.25	406	414	439	476	566	723	912	1,090	1,400
0.90	1.11	535	545	580	628	760	997	1,270	1,530	1,940
0.96	1.04	698	710	758	820	1,010	1,370	1,770	2,170	2,690
0.98	1.02	817	829	888	958	1,200	1,670	2,180	2,680	3,280
0.99	1.01	933	944	1,010	1,090	1,380	1,970	2,600	3,230	3,890

Magnitude and frequency of seasonal low discharges, based on period of record October 1956 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	21	23	25	40	71	79	84	94
0.02	50	30	33	35	54	99	110	118	133
0.05	20	50	54	57	85	158	177	192	222
0.10	10	77	83	88	124	235	265	289	342
0.20	5	125	135	143	195	371	419	462	561
0.50	2	295	319	340	444	822	930	1,050	1,330
0.80	1.25	633	680	741	964	1,660	1,870	2,140	2,860
0.90	1.11	910	972	1,080	1,420	2,310	2,600	3,000	4,110
0.96	1.04	1,300	1,380	1,560	2,120	3,200	3,580	4,170	5,870
0.98	1.02	1,620	1,710	1,960	2,720	3,900	4,350	5,090	7,280
0.99	1.01	1,950	2,050	2,380	3,390	4,620	5,120	6,030	8,750
		July-August-September				October-November-December			
0.01	100	81	84	89	109	27	28	29	35
0.02	50	90	94	100	123	37	40	41	50
0.05	20	107	113	121	148	60	64	68	82
0.10	10	129	136	147	180	89	96	104	125
0.20	5	165	176	192	234	141	153	169	202
0.50	2	292	316	349	429	316	347	396	472
0.80	1.25	593	650	722	901	647	719	832	1,010
0.90	1.11	909	1,000	1,110	1,410	908	1,010	1,180	1,440
0.96	1.04	1,500	1,670	1,850	2,380	1,270	1,430	1,660	2,060
0.98	1.02	2,120	2,380	2,620	3,430	1,560	1,760	2,030	2,550
0.99	1.01	2,960	3,320	3,650	4,840	1,850	2,100	2,420	3,070

05454000 RAPID CREEK NEAR IOWA CITY, IOWA

LOCATION.—Lat 41°41'19", long 91°29'15", in NE1/4 NE1/4 sec. 36, T80N, R6W, Johnson County, Hydrologic Unit 07080209, on left bank 80 ft upstream from bridge on State Highway 1, 3.5 mi northeast of Iowa City, and 4.7 mi upstream from mouth.

DRAINAGE AREA.—25.3 mi^2.

PERIOD OF RECORD.—October 1937 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder and concrete control with sharp-crested weir. Datum of gage is 673.72 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 6,700 ft^3/s, August 10, 1993, gage height, 15.61 ft; no flow many days throughout period of record.

Selected values from rating table number 10, developed October 1994

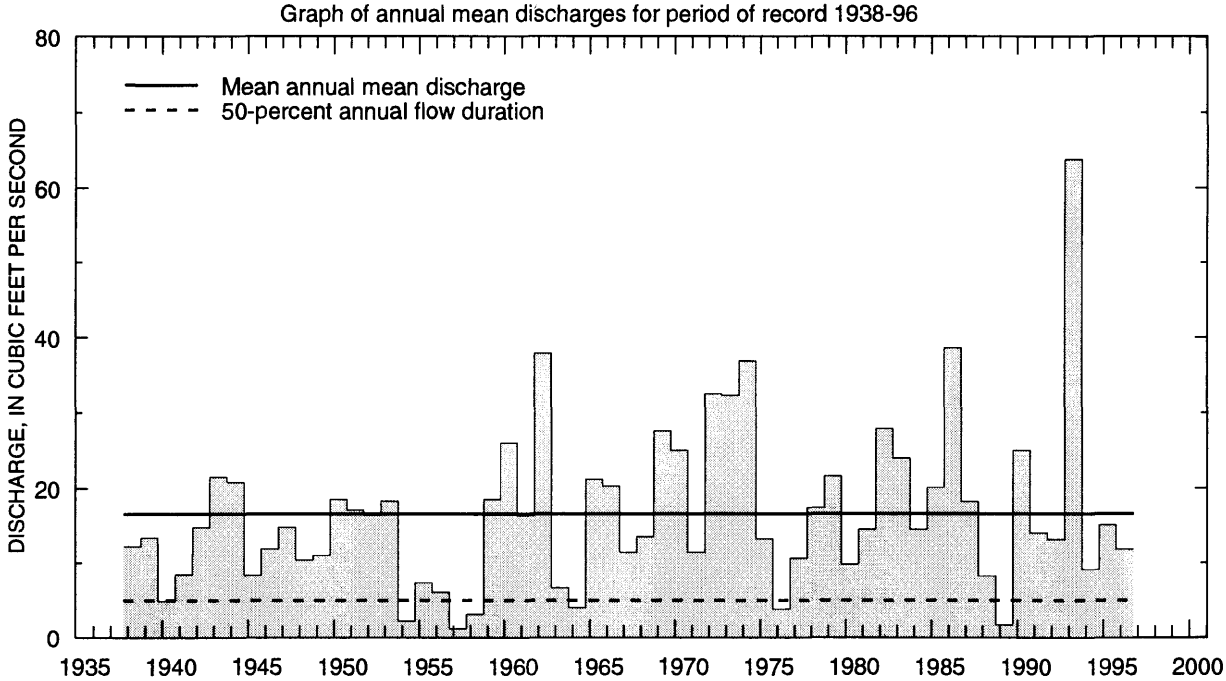
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.11	0.0	7.0	364
3.5	1.23	8.0	514
4.0	12.4	10.0	980
4.5	35.3	12.0	1,970
5.0	74.4	14.0	4,030
6.0	207	16.0	7,500

05454000 RAPID CREEK NEAR IOWA CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1938-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	36.5	1942	0.000	1965	6.70	9.76
November	84.0	1993	0.000	1956	10.4	17.0
December	66.6	1983	0.000	1956	9.38	12.3
January	56.8	1946	0.000	1956	9.95	11.5
February	77.5	1953	0.22	1989	22.0	21.7
March	106	1979	0.42	1956	29.5	23.8
April	98.6	1973	1.25	1956	23.6	19.2
May	167	1974	1.13	1977	27.1	32.5
June	134	1990	0.21	1956	24.2	24.8
July	105	1969	0.000	1957	16.2	23.5
August	176	1993	0.032	1955	12.2	26.6
September	66.6	1965	0.000	1988	8.20	14.9
Annual	63.8	1993	1.09	1957	16.6	11.0

Graph of annual mean discharges for period of record 1938-96



05454000 RAPID CREEK NEAR IOWA CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1938-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.20	0.10	0.09	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.10	0.95	1.5	0.88	0.30	0.00	0.00	0.00	0.00
90	0.00	0.10	0.10	0.02	0.40	2.0	2.8	2.3	0.84	0.10	0.00	0.00	0.10
85	0.01	0.20	0.10	0.16	0.70	3.2	3.9	3.4	1.4	0.29	0.05	0.00	0.22
80	0.08	0.30	0.22	0.35	1.4	4.5	5.5	4.2	2.1	0.60	0.13	0.03	0.50
75	0.11	0.40	0.43	0.60	2.0	5.4	6.5	4.9	2.8	0.93	0.23	0.08	0.89
70	0.20	0.63	0.68	1.0	2.4	6.4	7.6	5.8	3.6	1.3	0.39	0.10	1.5
60	0.49	1.6	1.7	2.3	4.0	8.5	10	8.1	6.0	2.6	0.80	0.30	3.0
50	1.1	3.2	3.5	3.7	5.5	12	14	11	9.0	4.2	1.4	0.70	4.9
40	2.7	4.9	5.7	5.2	7.4	16	18	15	13	6.0	2.5	1.7	7.4
30	4.3	8.3	8.2	7.0	10	23	23	20	18	8.6	4.5	3.2	11
25	5.8	10	10	8.4	12	28	27	25	22	10	6.1	4.1	14
20	8.2	13	12	10	17	35	33	31	27	13	8.1	5.5	18
15	12	17	15	12	25	45	39	38	35	19	12	7.8	24
10	17	23	22	19	40	61	50	52	46	29	18	15	34
5	28	34	33	30	90	112	72	82	78	55	42	30	58

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 59 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	110
0.95	1.05	256
0.90	1.11	389
0.80	1.25	629
0.50	2	1,450
0.20	5	3,020
0.10	10	4,260
0.04	25	5,960
0.02	50	7,300
0.01	100	8,670
0.005	200	10,100

Magnitude and frequency of annual high discharges, based on period of record 1938-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	23	13	7.2	4.4
0.95	1.05	51	31	19	12
0.90	1.11	76	47	30	19
0.80	1.25	119	74	48	32
0.50	2	249	150	97	65
0.20	5	459	258	157	105
0.10	10	601	322	187	124
0.04	25	774	390	214	141
0.02	50	896	433	228	150
0.01	100	1,010	469	239	156
0.005	200	1,120	500	247	161

05454000 RAPID CREEK NEAR IOWA CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1938 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.14
0.10	10	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.16	0.35
0.20	5	0.00	0.00	0.00	0.00	0.01	0.13	0.27	0.42	0.89
0.50	2	0.07	0.08	0.12	0.18	0.33	0.83	1.3	1.9	3.6
0.80	1.25	0.59	0.66	0.84	1.2	1.6	3.1	4.8	6.6	11
0.90	1.11	1.3	1.4	1.7	2.2	3.1	5.7	8.6	11	16
0.96	1.04	2.8	3.0	3.2	3.7	5.7	9.9	15	19	24
0.98	1.02	4.4	4.6	4.7	4.8	8.3	14	21	25	30
0.99	1.01	6.8	6.9	6.9	7.0	12	18	28	32	36

Magnitude and frequency of seasonal low discharges, based on period of record October 1937 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
0.05	20	0.00	0.00	0.00	0.00	0.00	0.06	0.20	0.58
0.10	10	0.00	0.00	0.00	0.09	0.21	0.25	0.53	1.1
0.20	5	0.07	0.12	0.19	0.60	0.56	0.76	1.2	2.3
0.50	2	1.2	1.6	2.0	3.9	2.3	3.3	3.9	6.9
0.80	1.25	4.0	4.6	5.8	10	6.7	8.9	11	17
0.90	1.11	6.2	6.8	8.0	14	11	13	17	26
0.96	1.04	9.0	9.2	10	17	18	19	26	39
0.98	1.02	11	11	11	19	24	26	35	49
0.99	1.01	12	12	12	20	30	32	44	60
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.20	5	0.00	0.00	0.00	0.08	0.00	0.01	0.04	0.13
0.50	2	0.10	0.16	0.25	0.62	0.33	0.49	0.66	1.1
0.80	1.25	0.75	1.1	1.5	3.0	2.2	2.9	3.5	5.3
0.90	1.11	1.9	2.7	3.6	6.4	4.9	6.1	7.4	11
0.96	1.04	4.5	6.3	7.9	13	10	12	15	21
0.98	1.02	7.9	11	13	21	16	18	22	31
0.99	1.01	13	18	21	32	25	26	31	44

05454300 CLEAR CREEK NEAR CORALVILLE, IOWA

LOCATION.—Lat 41°40'36", long 91°35'55", in NE1/4 SE1/4 sec. 1, T79N, R7W, Johnson County, Hydrologic Unit 07080209, on left bank about 15 ft upstream from bridge on county road, 1.1 mi west of Post Office in Coralville, 1.5 mi downstream from Deer Creek and 2.7 mi upstream from mouth.

DRAINAGE AREA.—98.1 mi^2.

PERIOD OF RECORD.—October 1952 to September 1996. Monthly discharge only for some periods, published in WSP 1728.

GAGE.—Water-stage recorder. Datum of gage is 647.48 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to January 7, 1957, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,200 ft^3/s, June 17, 1990, gage height, 16.36 ft; no flow January 18 to February 4, 1977.

Selected values from rating table number 19, developed October 1996

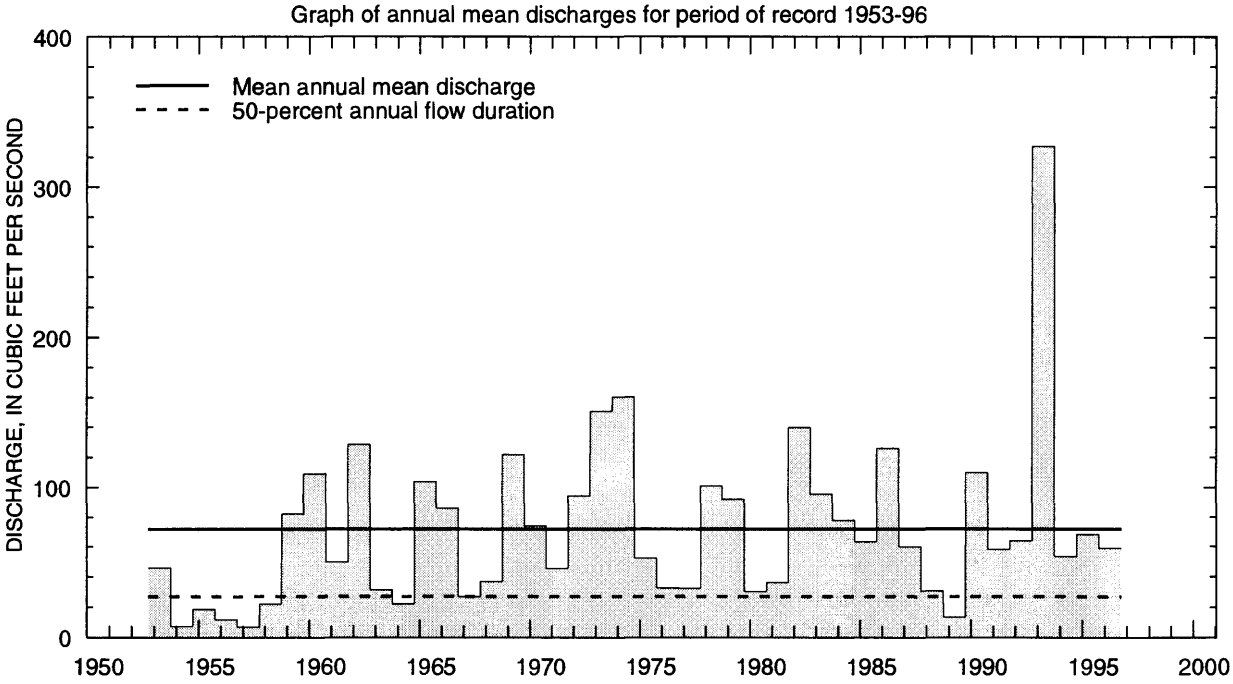
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.8	2.03	6.0	426
2.0	5.69	7.0	619
3.0	52.2	9.0	1,090
4.0	143	11.0	1,760
5.0	267	13.0	3,300

05454300 CLEAR CREEK NEAR CORALVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	143	1987	0.55	1958	29.8	32.9
November	246	1962	0.95	1956	45.2	54.4
December	162	1993	0.54	1956	40.2	40.2
January	206	1960	0.10	1977	40.2	49.0
February	229	1959	2.79	1954	68.9	57.7
March	402	1979	4.49	1954	114	101
April	452	1973	4.15	1956	103	91.1
May	589	1974	3.79	1956	114	126
June	566	1990	0.83	1956	104	114
July	991	1993	1.69	1954	94.7	175
August	759	1993	1.94	1953	62.9	126
September	337	1965	0.69	1953	45.4	73.3
Annual	327	1993	6.57	1957	71.8	56.7

Graph of annual mean discharges for period of record 1953-96



05454300 CLEAR CREEK NEAR CORALVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.40	0.80	0.30	0.00	0.30	3.3	2.1	1.7	0.60	0.90	0.70	0.50	0.40
95	1.0	1.3	0.70	0.40	1.5	6.0	5.4	3.3	2.9	1.7	1.5	0.80	1.4
90	1.5	2.5	1.3	1.5	3.0	10	9.4	6.5	4.8	2.6	2.4	1.4	2.7
85	2.2	3.6	2.0	2.7	5.6	14	15	13	8.8	4.7	3.4	2.0	4.0
80	2.9	4.4	3.5	4.4	8.4	19	20	19	12	7.0	4.2	2.7	5.4
75	3.7	5.2	4.8	5.8	13	23	27	22	16	9.4	5.1	3.3	7.7
70	4.4	6.8	7.4	8.0	15	28	31	26	19	11	6.1	4.2	11
60	6.6	11	14	13	22	38	41	35	29	16	8.6	5.9	18
50	12	22	24	21	27	51	58	50	40	23	12	9.3	27
40	22	33	34	26	35	67	80	69	58	34	19	16	37
30	30	48	45	33	50	96	104	92	84	46	28	24	54
25	39	55	50	37	62	116	119	111	100	56	36	29	66
20	47	64	60	45	80	138	138	132	125	72	47	38	82
15	60	75	72	64	100	180	166	169	160	107	63	54	107
10	74	95	92	78	144	240	215	220	204	175	105	101	150
5	109	146	124	113	250	403	305	383	325	433	266	199	251

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 44 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	274
0.95	1.05	493
0.90	1.11	669
0.80	1.25	961
0.50	2	1,880
0.20	5	3,600
0.10	10	5,000
0.04	25	7,040
0.02	50	8,740
0.01	100	10,600
0.005	200	12,600

Magnitude and frequency of annual high discharges, based on period of record 1953-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	91	50	30	21
0.95	1.05	183	107	68	47
0.90	1.11	261	155	101	68
0.80	1.25	394	236	158	105
0.50	2	815	489	329	222
0.20	5	1,570	919	599	417
0.10	10	2,150	1,230	779	556
0.04	25	2,940	1,640	994	735
0.02	50	3,560	1,940	1,140	866
0.01	100	4,200	2,240	1,280	993
0.005	200	4,860	2,540	1,410	1,120

05454300 CLEAR CREEK NEAR CORALVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.07	0.16	0.38	0.48	0.59
0.02	50	0.00	0.00	0.00	0.00	0.14	0.28	0.59	0.74	0.99
0.05	20	0.17	0.20	0.26	0.30	0.35	0.62	1.1	1.4	2.0
0.10	10	0.39	0.44	0.55	0.63	0.74	1.2	1.9	2.4	3.7
0.20	5	0.87	0.95	1.1	1.3	1.7	2.5	3.5	4.4	7.1
0.50	2	3.0	3.2	3.6	4.2	5.9	8.3	10	13	21
0.80	1.25	8.3	8.7	9.6	11	15	21	27	35	50
0.90	1.11	13	14	15	17	21	32	44	55	73
0.96	1.04	20	21	24	27	29	46	69	88	103
0.98	1.02	26	28	31	35	38	57	92	116	125
0.99	1.01	33	35	39	44	50	67	117	148	150

Magnitude and frequency of seasonal low discharges, based on period of record October 1952 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.07	0.27	0.50	0.69	1.1
0.02	50	0.00	0.00	0.00	0.17	0.48	0.83	1.1	1.7
0.05	20	0.34	0.42	0.45	0.61	1.1	1.7	2.2	3.3
0.10	10	0.87	1.1	1.2	1.6	2.1	3.0	3.7	5.6
0.20	5	2.2	2.7	3.0	4.3	4.5	5.7	7.0	10
0.50	2	8.2	9.8	11	18	14	17	20	30
0.80	1.25	23	25	28	43	36	40	49	74
0.90	1.11	34	37	40	56	52	59	73	111
0.96	1.04	51	52	54	68	72	84	108	164
0.98	1.02	63	64	65	73	87	103	135	207
0.99	1.01	74	75	76	77	100	121	162	250
		July-August-September				October-November-December			
0.01	100	0.14	0.32	0.41	0.59	0.08	0.09	0.10	0.19
0.02	50	0.22	0.42	0.53	0.77	0.13	0.17	0.18	0.32
0.05	20	0.39	0.64	0.79	1.2	0.30	0.37	0.43	0.69
0.10	10	0.65	0.96	1.2	1.7	0.60	0.73	0.86	1.3
0.20	5	1.2	1.6	1.9	2.8	1.3	1.6	1.9	2.8
0.50	2	3.8	4.4	5.1	7.5	5.0	6.0	7.5	10
0.80	1.25	11	13	15	23	16	19	24	32
0.90	1.11	20	24	28	42	28	33	41	54
0.96	1.04	35	46	55	84	49	57	69	93
0.98	1.02	51	72	88	133	67	78	94	129
0.99	1.01	71	109	134	203	89	102	121	170

05454500 IOWA RIVER AT IOWA CITY, IOWA

LOCATION.—Lat 41°39'24", long 91°32'27", in SE1/4 SE1/4 sec. 9, T79N, R6W, Johnson County, Hydrologic Unit 07080209, on right bank 25 ft downstream from Hydraulics Laboratory of University of Iowa in Iowa City, 175 ft downstream from University Dam, 0.8 mi upstream from Ralston Creek, 3.6 mi downstream from Clear Creek, and at mile 74.2.

DRAINAGE AREA.—3,271 mi^2.

PERIOD OF RECORD.—June 1903 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 29.00 ft above Iowa City datum, and 617.27 ft above sea level. October 1, 1934 to September 30, 1972, at datum 10.00 ft higher. See WSP 1708 for history of changes prior to October 1, 1934.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 42,500 ft^3/s, June 8, 1918, gage height, 19.6 ft datum then in use; minimum daily discharge, 29 ft^3/s, October 21, 22, 1916, regulated.

REMARKS.—Flow regulated since September 17, 1958, by Coralville Dam and Reservoir (station 05453510) 9.1 mi upstream.

Selected values from rating table number 14, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.0	123	16.0	5,240
10.0	415	18.0	7,310
11.0	958	20.0	9,600
12.0	1,790	24.0	15,400
13.0	2,640	28.0	26,000
14.0	3,410	31.0	50,000

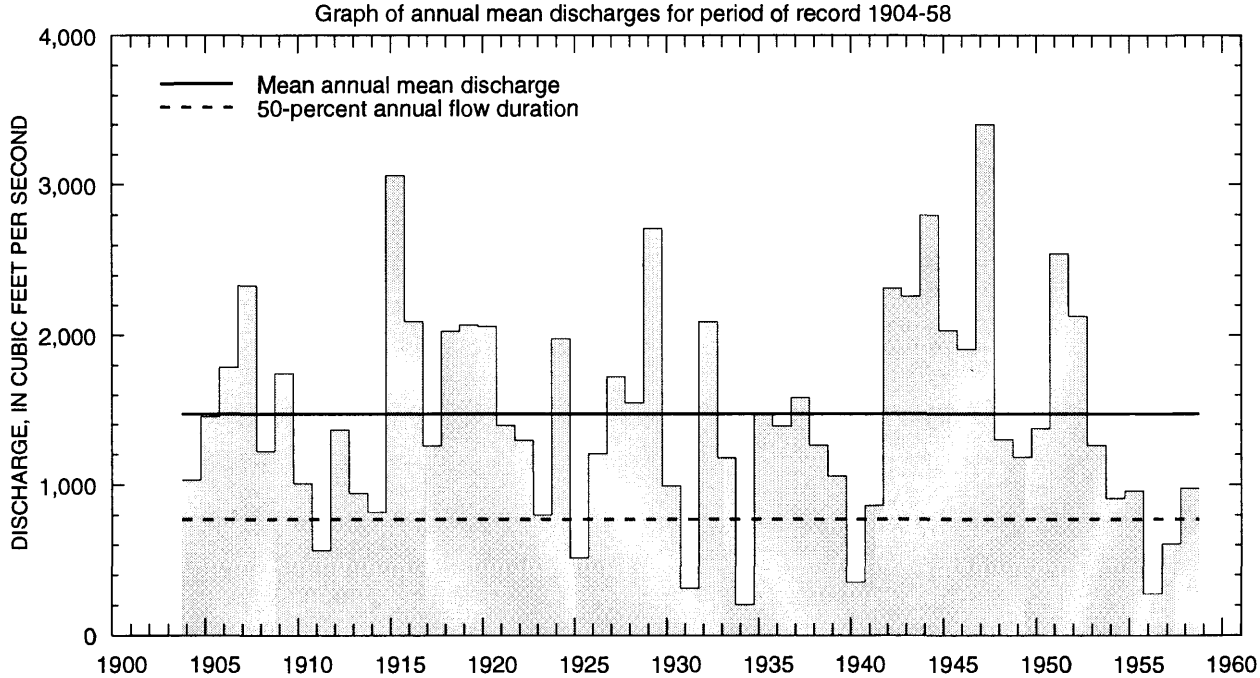
05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1904-58

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4,694	1916	116	1957	825	905
November	3,779	1942	109	1956	819	818
December	3,253	1932	64.5	1956	630	603
January	3,936	1946	49.4	1940	709	817
February	7,971	1915	48.8	1940	1,399	1,230
March	8,800	1929	202	1931	2,900	1,942
April	8,185	1951	282	1934	2,322	1,691
May	9,856	1944	112	1934	2,105	1,671
June	16,500	1947	56.0	1934	2,668	2,818
July	5,819	1947	156	1911	1,515	1,357
August	3,895	1924	83.5	1931	858	868
September	5,149	1926	124	1934	937	1,056
Annual	3,399	1947	204	1934	1,472	717

Graph of annual mean discharges for period of record 1904-58



05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1904-58

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	70	77	60	44	41	161	211	114	59	76	62	72	63
95	104	112	86	68	91	242	369	320	230	141	107	102	110
90	129	134	103	94	150	425	532	427	441	222	147	125	156
85	152	158	130	120	214	606	667	535	532	311	183	146	206
80	173	183	166	150	258	840	815	654	640	387	219	174	259
75	197	212	204	188	323	1,020	980	780	738	461	256	209	321
70	217	254	250	222	409	1,220	1,140	850	947	534	295	241	400
60	280	407	320	310	570	1,620	1,440	1,140	1,280	732	365	322	570
50	418	530	419	400	740	2,080	1,700	1,560	1,710	957	469	458	770
40	625	665	526	537	1,060	2,610	2,030	1,920	2,200	1,230	642	632	1,080
30	884	831	674	699	1,600	3,250	2,500	2,350	2,920	1,610	834	897	1,520
25	1,020	1,000	780	769	1,870	3,700	2,840	2,620	3,190	1,860	980	1,120	1,800
20	1,280	1,140	950	900	2,140	4,400	3,550	3,060	3,800	2,180	1,160	1,380	2,180
15	1,490	1,420	1,130	1,020	2,650	5,130	4,130	3,760	4,490	2,580	1,450	1,580	2,710
10	2,040	1,840	1,350	1,380	3,200	6,360	4,830	4,290	5,270	3,300	1,850	1,890	3,490
5	2,900	2,570	1,840	2,800	4,000	8,700	6,290	5,610	7,690	4,900	3,200	2,970	4,900

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 64 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	3,540
0.90	1.11	4,610
0.80	1.25	6,290
0.50	2	11,100
0.20	5	19,000
0.10	10	24,800
0.04	25	32,600
0.02	50	38,800
0.01	100	45,200
0.005	200	51,800

Magnitude and frequency of annual high discharges, based on period of record 1904-58

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,350	1,050	693	493
0.95	1.05	2,480	2,050	1,490	1,100
0.90	1.11	3,360	2,840	2,150	1,600
0.80	1.25	4,750	4,100	3,200	2,410
0.50	2	8,740	7,620	6,090	4,590
0.20	5	15,000	12,800	10,000	7,430
0.10	10	19,300	16,100	12,300	9,010
0.04	25	24,800	20,100	14,800	10,600
0.02	50	28,900	22,800	16,300	11,600
0.01	100	32,900	25,300	17,700	12,400
0.005	200	36,900	27,700	18,800	13,100

05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1904 to March 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	19	24	27	30	34	40	50	56	72
0.02	50	23	30	33	37	42	51	63	70	91
0.05	20	32	41	45	50	58	71	88	99	128
0.10	10	42	54	60	66	77	96	118	135	172
0.20	5	59	75	83	91	108	138	168	194	246
0.50	2	113	140	155	170	205	269	327	384	484
0.80	1.25	218	255	286	316	389	515	634	745	939
0.90	1.11	306	347	391	437	543	718	892	1,050	1,320
0.96	1.04	441	480	545	616	774	1,020	1,280	1,500	1,900
0.98	1.02	559	591	674	768	972	1,270	1,610	1,880	2,390
0.99	1.01	692	711	814	937	1,190	1,540	1,990	2,300	2,930

Magnitude and frequency of seasonal low discharges, based on period of record October 1903 to September 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	26	32	33	41	40	60	69	93
0.02	50	32	40	43	54	60	88	99	131
0.05	20	45	56	62	81	106	147	166	214
0.10	10	62	77	86	115	167	225	253	320
0.20	5	91	114	129	176	277	357	401	504
0.50	2	194	242	277	390	629	756	854	1,080
0.80	1.25	428	525	597	843	1,200	1,350	1,550	2,010
0.90	1.11	654	795	890	1,250	1,570	1,720	1,990	2,640
0.96	1.04	1,040	1,250	1,360	1,890	2,000	2,130	2,510	3,420
0.98	1.02	1,400	1,670	1,800	2,460	2,290	2,390	2,850	3,970
0.99	1.01	1,850	2,180	2,300	3,110	2,550	2,630	3,150	4,480
		July-August-September				October-November-December			
0.01	100	27	45	51	62	28	39	42	51
0.02	50	32	53	60	74	34	48	52	63
0.05	20	43	68	77	96	46	66	72	86
0.10	10	56	86	98	123	61	87	96	114
0.20	5	79	117	132	168	87	123	135	161
0.50	2	164	222	250	324	173	236	262	314
0.80	1.25	369	454	511	672	351	454	502	614
0.90	1.11	585	679	767	1,010	514	638	703	875
0.96	1.04	983	1,070	1,210	1,610	777	917	1,000	1,280
0.98	1.02	1,400	1,450	1,650	2,200	1,020	1,160	1,260	1,630
0.99	1.01	1,930	1,930	2,200	2,930	1,310	1,430	1,550	2,040

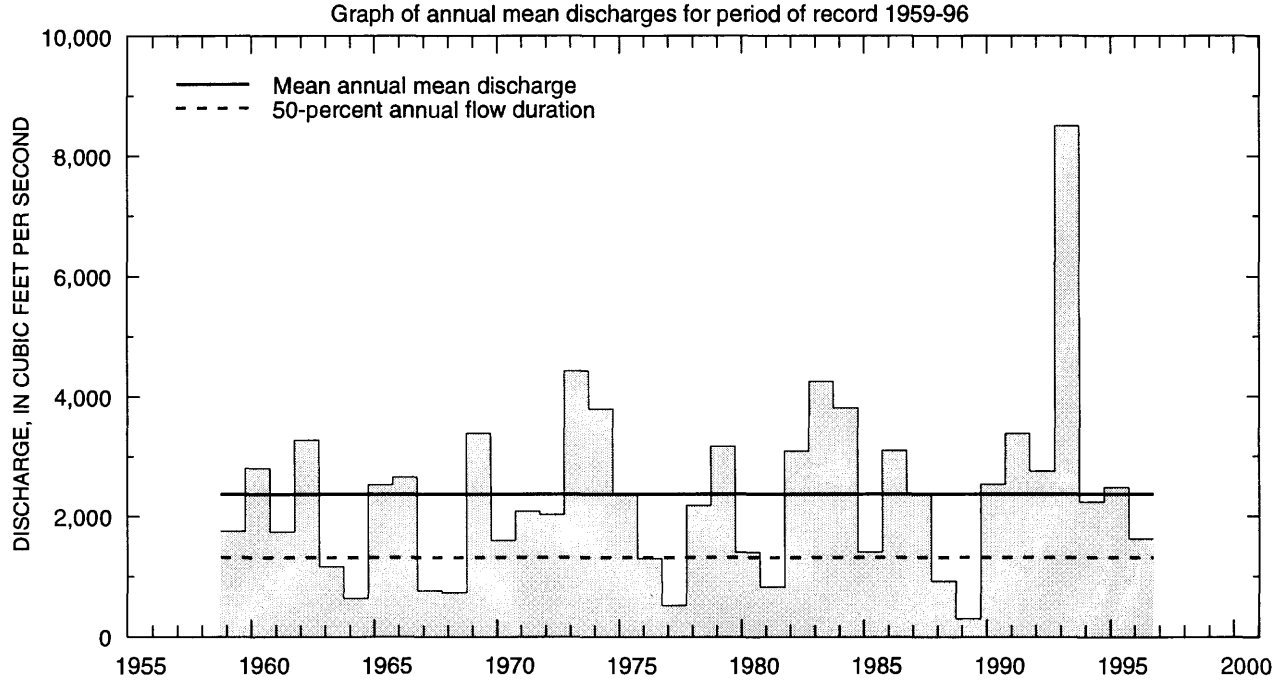
05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4,277	1994	135	1990	1,189	1,071
November	5,395	1987	121	1967	1,512	1,302
December	4,580	1983	130	1989	1,482	1,209
January	5,381	1973	141	1990	1,106	1,112
February	5,789	1973	125	1977	1,752	1,187
March	7,988	1971	366	1977	3,439	2,028
April	9,764	1979	348	1989	3,818	2,680
May	9,763	1993	184	1977	3,241	2,331
June	11,590	1991	99.1	1977	3,534	2,678
July	22,220	1993	72.8	1977	3,390	3,878
August	20,060	1993	162	1989	2,279	3,394
September	13,760	1993	147	1976	1,573	2,333
Annual	8,502	1993	304	1989	2,362	1,485

Graph of annual mean discharges for period of record 1959-96



05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	129	120	120	125	102	120	189	149	101	59	92	123	118
95	143	139	142	140	200	320	440	221	163	154	167	152	153
90	152	158	165	154	291	545	710	418	337	224	204	166	205
85	157	256	300	199	424	716	919	629	558	453	270	181	314
80	179	336	366	260	541	947	1,050	827	798	630	361	218	428
75	383	438	451	304	637	1,190	1,240	1,050	1,080	756	444	274	544
70	459	582	520	328	760	1,360	1,420	1,340	1,310	907	520	322	656
60	600	722	765	483	983	1,930	1,960	1,790	2,070	1,390	642	430	948
50	781	1,060	1,060	664	1,170	2,660	2,500	2,560	3,320	2,060	848	624	1,310
40	1,040	1,450	1,400	896	1,420	3,400	3,570	3,690	4,170	3,250	1,220	884	1,830
30	1,300	1,850	1,740	1,160	1,820	4,600	5,230	4,480	4,640	4,190	2,120	1,330	2,720
25	1,520	2,110	1,930	1,380	2,080	5,370	5,850	4,790	5,230	4,510	3,070	1,850	3,430
20	1,860	2,370	2,320	1,540	2,420	6,080	7,080	5,720	5,960	5,320	4,200	2,210	4,120
15	2,380	3,000	2,790	1,800	3,020	6,990	8,460	6,120	6,220	6,140	4,550	3,380	4,730
10	2,980	4,000	3,640	2,430	3,750	8,110	9,550	6,670	6,690	7,080	5,190	4,280	5,990
5	3,950	4,370	4,510	3,780	6,290	8,910	9,850	8,510	9,890	8,820	6,790	5,000	7,580

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05454500 IOWA RIVER AT IOWA CITY, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	55	55	55	55	55	55	55	69	100
0.02	50	63	64	64	64	69	70	75	94	136
0.05	20	77	79	80	85	94	102	119	146	210
0.10	10	94	97	101	111	124	146	175	212	303
0.20	5	120	126	136	152	174	221	274	329	461
0.50	2	201	216	244	282	339	476	610	722	958
0.80	1.25	357	395	454	525	667	978	1,260	1,490	1,820
0.90	1.11	494	554	637	727	955	1,400	1,790	2,110	2,460
0.96	1.04	712	811	923	1,030	1,410	2,020	2,550	3,020	3,300
0.98	1.02	911	1,050	1,180	1,290	1,810	2,540	3,170	3,760	3,940
0.99	1.01	1,150	1,330	1,480	1,590	2,280	3,110	3,820	4,550	4,590

Magnitude and frequency of seasonal low discharges, based on period of record October 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	65	65	67	77	38	41	51	78
0.02	50	80	82	85	99	58	63	79	119
0.05	20	109	115	121	144	103	115	146	219
0.10	10	142	155	164	200	167	190	244	362
0.20	5	197	221	237	296	283	335	437	639
0.50	2	367	424	471	617	671	880	1,190	1,670
0.80	1.25	682	795	916	1,260	1,330	1,990	2,780	3,730
0.90	1.11	941	1,090	1,290	1,800	1,790	2,880	4,100	5,350
0.96	1.04	1,330	1,530	1,840	2,630	2,340	4,120	5,970	7,540
0.98	1.02	1,650	1,880	2,310	3,350	2,710	5,070	7,440	9,200
0.99	1.01	2,020	2,270	2,820	4,150	3,060	6,040	8,960	10,900
		July-August-September				October-November-December			
0.01	100	72	72	72	78	60	60	60	58
0.02	50	79	80	82	91	75	75	75	79
0.05	20	89	95	101	117	103	107	109	124
0.10	10	103	114	125	151	138	148	155	181
0.20	5	130	150	171	216	194	216	234	284
0.50	2	238	295	357	492	366	437	509	641
0.80	1.25	568	727	922	1,370	677	857	1,080	1,370
0.90	1.11	1,000	1,290	1,660	2,570	926	1,200	1,600	1,990
0.96	1.04	2,030	2,550	3,330	5,360	1,280	1,710	2,400	2,910
0.98	1.02	3,360	4,160	5,440	8,950	1,580	2,140	3,120	3,690
0.99	1.01	5,500	6,650	8,690	14,600	1,900	2,600	3,930	4,540

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05455000 RALSTON CREEK AT IOWA CITY, IOWA

LOCATION.—Lat 41°39'50", long 91°30'48", in SE1/4 NW1/4 sec. 11, T79N, R6W, Johnson County, Hydrologic Unit 07080209, on left bank 10 ft upstream from bridge on Rochester Avenue, 1.0 mi northeast of Post Office in Iowa City and 2.2 mi upstream from mouth.

DRAINAGE AREA.—3.01 mi^2.

PERIOD OF RECORD.—September 1924 to September 1987 (discontinued).

GAGE.—Water stage recorder and V-notch sharp-crested weir. Datum of gage is 663.27 ft above sea level (University of Iowa bench mark).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 1,760 ft^3/s, July 17, 1972, gage height, 9.01 ft; no flow many days throughout the period of record.

REMARKS.—Flood retention dam installed upstream in 1982.

Selected values from rating table number 8, developed October 1978
(A discharge measurement to validate this rating has not been made since November 1987)

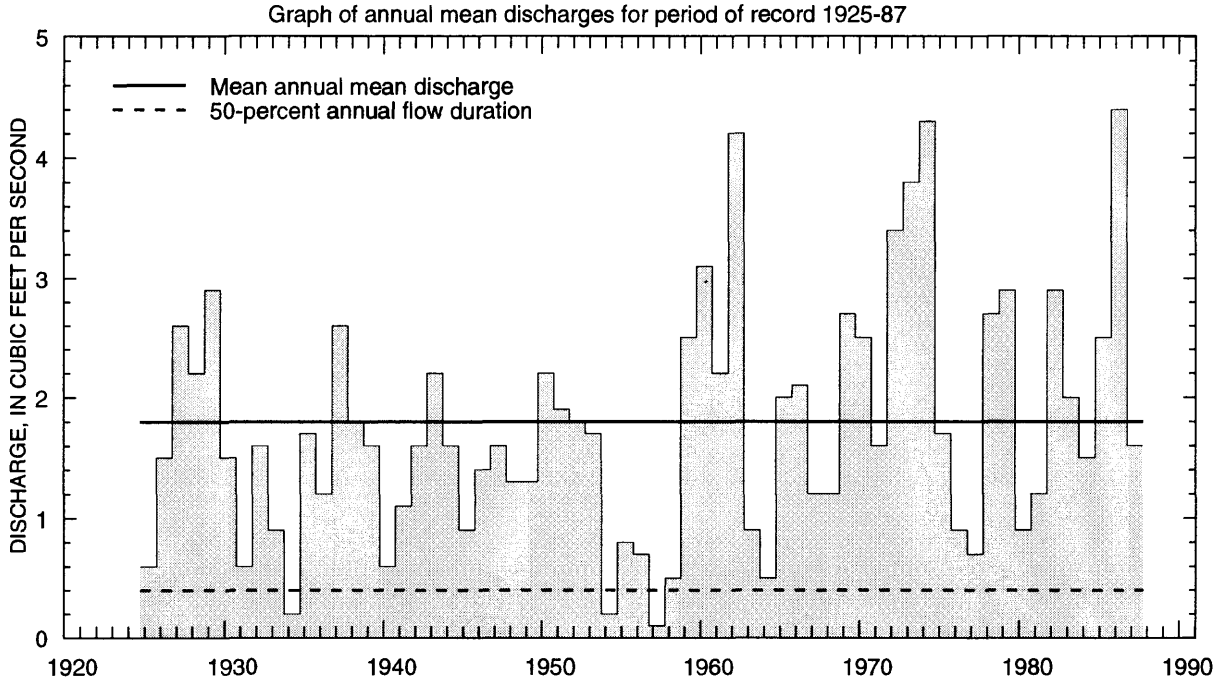
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	1.3	6.0	510
3.0	17	7.0	730
3.5	68	8.0	1,060
4.0	165	9.0	1,750
5.0	340		

05455000 RALSTON CREEK AT IOWA CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1925-87

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	6.57	1928	0.000	1956	0.90	1.36
November	11.3	1962	0.000	1956	1.11	1.68
December	5.54	1983	0.000	1956	0.92	1.03
January	5.91	1938	0.000	1956	1.14	1.43
February	12.6	1982	0.013	1934	2.91	2.81
March	16.9	1979	0.006	1956	3.50	3.22
April	11.2	1973	0.010	1956	2.58	2.11
May	16.9	1974	0.000	1934	2.29	2.83
June	6.64	1927	0.000	1956	2.26	2.02
July	9.93	1969	0.000	1957	1.67	2.25
August	6.31	1972	0.000	1936	0.96	1.30
September	8.47	1965	0.000	1955	1.04	1.78
Annual	4.40	1986	0.080	1957	1.77	1.01

Graph of annual mean discharges for period of record 1925-87



05455000 RALSTON CREEK AT IOWA CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1925-87

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.02	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.02	0.20	0.26	0.11	0.01	0.00	0.00	0.00	0.00
85	0.00	0.02	0.01	0.00	0.10	0.30	0.40	0.20	0.07	0.00	0.00	0.00	0.01
80	0.00	0.05	0.03	0.03	0.14	0.40	0.50	0.29	0.11	0.02	0.00	0.00	0.04
75	0.02	0.07	0.07	0.07	0.19	0.50	0.60	0.36	0.17	0.04	0.00	0.00	0.08
70	0.03	0.10	0.10	0.10	0.23	0.63	0.75	0.43	0.21	0.07	0.02	0.00	0.11
60	0.07	0.20	0.20	0.17	0.35	0.86	1.0	0.63	0.36	0.15	0.05	0.03	0.24
50	0.13	0.36	0.31	0.26	0.53	1.2	1.5	0.92	0.55	0.24	0.10	0.06	0.41
40	0.29	0.55	0.46	0.40	0.72	1.7	1.9	1.2	0.82	0.40	0.19	0.12	0.65
30	0.57	0.84	0.73	0.57	1.0	2.5	2.4	1.6	1.2	0.66	0.32	0.23	1.0
25	0.72	1.0	0.88	0.74	1.4	3.0	2.8	1.9	1.6	0.88	0.45	0.32	1.3
20	0.92	1.3	1.0	0.96	2.0	4.0	3.3	2.5	2.0	1.1	0.60	0.51	1.6
15	1.2	1.6	1.3	1.2	3.1	5.0	4.2	3.3	2.8	1.6	0.89	0.85	2.2
10	1.7	2.1	1.6	1.8	5.8	7.4	5.3	4.7	4.1	2.5	1.4	1.4	3.4
5	3.0	3.7	2.6	3.8	13	14	7.8	7.7	8.0	4.8	3.6	3.0	6.3

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 58 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	42
0.95	1.05	87
0.90	1.11	125
0.80	1.25	191
0.50	2	408
0.20	5	816
0.10	10	1,140
0.04	25	1,600
0.02	50	1,970
0.01	100	2,360
0.005	200	2,770

[a] Analysis includes only period of record prior to installation of flood retention dam (1925-82).

Magnitude and frequency of annual high discharges, based on period of record 1925-87

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	3.2	1.7	0.81	0.59
0.95	1.05	7.1	3.9	2.2	1.5
0.90	1.11	10	5.8	3.4	2.3
0.80	1.25	16	8.9	5.4	3.5
0.50	2	30	17	11	7.0
0.20	5	51	28	17	11
0.10	10	63	34	20	13
0.04	25	76	40	23	15
0.02	50	84	43	24	16
0.01	100	92	46	25	17
0.005	200	98	48	26	17

05455000 RALSTON CREEK AT IOWA CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1925 to March 1987

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08
0.20	5	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.08	0.16
0.50	2	0.00	0.00	0.00	0.00	0.03	0.10	0.20	0.29	0.48
0.80	1.25	0.05	0.05	0.06	0.08	0.15	0.33	0.52	0.76	1.1
0.90	1.11	0.12	0.13	0.14	0.17	0.28	0.55	0.81	1.1	1.6
0.96	1.04	0.28	0.30	0.32	0.38	0.52	0.90	1.2	1.7	2.3
0.98	1.02	0.47	0.49	0.53	0.62	0.76	1.2	1.6	2.1	2.9
0.99	1.01	0.73	0.76	0.83	0.96	1.1	1.6	2.0	2.5	3.4

Magnitude and frequency of seasonal low discharges, based on period of record October 1924 to September 1987

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07
0.20	5	0.00	0.00	0.00	0.06	0.01	0.04	0.07	0.18
0.50	2	0.07	0.09	0.15	0.34	0.15	0.23	0.31	0.65
0.80	1.25	0.26	0.30	0.44	0.97	0.44	0.60	0.89	1.7
0.90	1.11	0.44	0.49	0.67	1.5	0.73	0.95	1.4	2.6
0.96	1.04	0.69	0.77	0.97	2.3	1.2	1.5	2.1	3.9
0.98	1.02	0.90	1.0	1.2	2.9	1.6	2.0	2.6	4.9
0.99	1.01	1.1	1.3	1.5	3.6	2.1	2.5	3.2	6.0
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
0.50	2	0.00	0.00	0.01	0.07	0.03	0.05	0.09	0.17
0.80	1.25	0.06	0.08	0.10	0.25	0.16	0.25	0.36	0.58
0.90	1.11	0.16	0.19	0.23	0.47	0.32	0.47	0.66	1.0
0.96	1.04	0.39	0.45	0.54	0.88	0.66	0.85	1.1	1.7
0.98	1.02	0.66	0.76	0.91	1.3	1.0	1.2	1.6	2.4
0.99	1.01	1.0	1.2	1.5	1.9	1.5	1.7	2.1	3.2

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOWA

LOCATION.—Lat 41°39'05", long 91°30'27", in SW1/4 NE1/4 sec. 14, T79N, R6W, Johnson County, Hydrologic Unit 07080209, on right bank 60 ft downstream from bridge on Muscatine Avenue in Iowa city and 1.2 mi upstream from mouth.

DRAINAGE AREA.—2.94 mi^2.

PERIOD OF RECORD.—October 1963 to September 1995 (discontinued).

GAGE.—Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 678.03 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 1,070 ft^3/s, July 17, 1972, gage height, 9.47 ft; no flow many days throughout the period of record.

REMARKS.—Flood retention dam installed upstream in 1980.

Selected values from rating table number 7, developed October 1985
(A discharge measurement to validate this rating has not been made since July 1995)

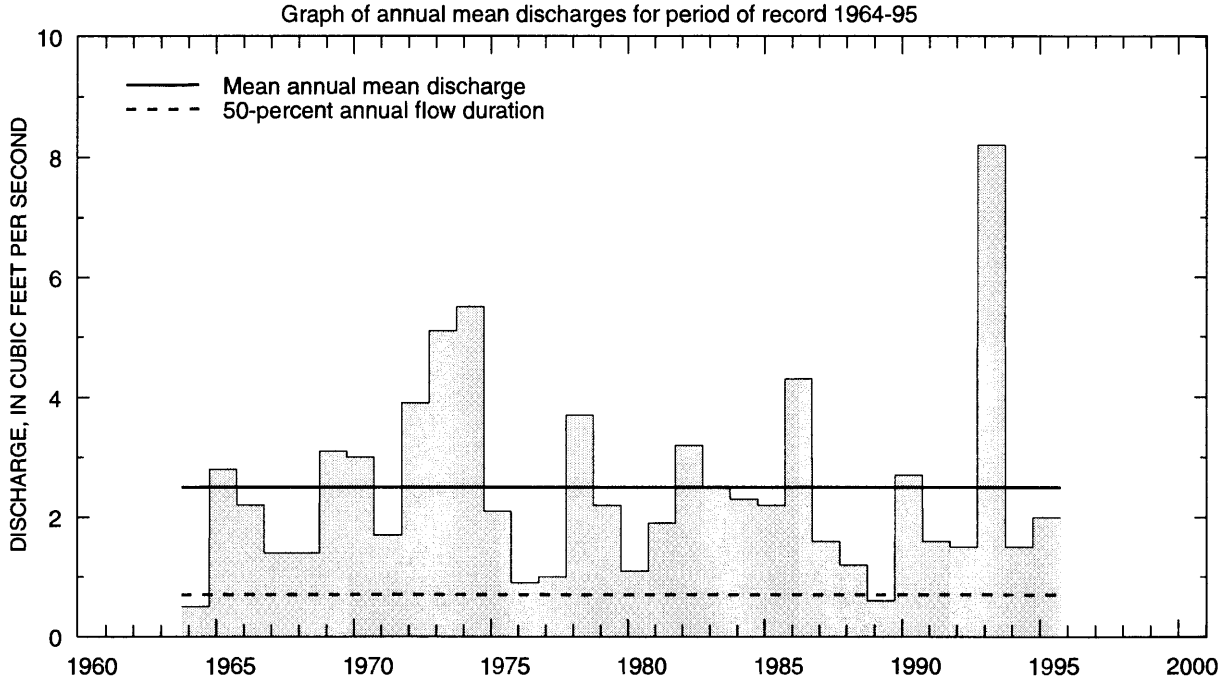
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	3.8	4.5	189
2.5	20	6.0	327
3.0	54	8.0	654
3.5	107	9.5	1,080

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1964-95

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4.52	1985	0.000	1964	1.15	1.22
November	7.55	1993	0.007	1990	1.50	1.54
December	7.85	1983	0.002	1990	1.51	1.66
January	6.17	1974	0.000	1977	1.28	1.42
February	10.1	1982	0.071	1989	2.61	2.68
March	10.2	1979	0.49	1981	3.21	2.62
April	15.3	1973	0.94	1990	3.89	3.37
May	16.3	1974	0.13	1992	3.64	4.15
June	12.7	1990	0.23	1992	3.86	3.30
July	17.6	1993	0.034	1988	2.99	4.12
August	23.2	1993	0.10	1964	2.31	4.23
September	8.44	1970	0.004	1991	1.73	2.25
Annual	8.19	1993	0.52	1964	2.47	1.60

Graph of annual mean discharges for period of record 1964-95



05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1964-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.10	0.14	0.01	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.21	0.34	0.18	0.03	0.00	0.00	0.00	0.00
90	0.00	0.02	0.00	0.00	0.03	0.36	0.53	0.29	0.13	0.01	0.00	0.00	0.01
85	0.00	0.10	0.02	0.08	0.10	0.49	0.68	0.38	0.22	0.06	0.00	0.00	0.09
80	0.02	0.12	0.10	0.13	0.14	0.60	0.80	0.48	0.33	0.10	0.02	0.00	0.15
75	0.05	0.19	0.20	0.16	0.20	0.66	0.91	0.56	0.45	0.15	0.05	0.03	0.21
70	0.09	0.24	0.30	0.20	0.25	0.71	1.1	0.64	0.54	0.20	0.10	0.08	0.30
60	0.20	0.45	0.45	0.30	0.46	0.97	1.4	0.87	0.71	0.33	0.20	0.16	0.50
50	0.39	0.67	0.62	0.50	0.70	1.4	1.8	1.2	0.97	0.57	0.36	0.29	0.71
40	0.60	0.91	0.85	0.70	0.93	1.9	2.3	1.8	1.3	0.84	0.53	0.41	1.0
30	0.94	1.2	1.1	0.90	1.4	2.7	3.1	2.8	2.2	1.4	0.81	0.67	1.5
25	1.1	1.5	1.4	1.0	1.9	3.2	3.5	3.4	2.9	1.8	1.0	0.90	1.9
20	1.5	1.8	1.8	1.2	2.5	4.0	4.4	4.2	3.6	2.4	1.5	1.3	2.5
15	2.0	2.1	2.1	1.5	3.5	5.1	5.8	5.7	5.0	3.5	2.2	1.9	3.4
10	2.6	3.1	3.0	2.3	5.4	6.7	8.0	7.9	7.4	5.2	3.8	3.2	5.0
5	4.5	5.0	4.8	5.1	11	12	13	13	17	12	9.2	6.1	9.1

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 17 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	59
0.95	1.05	111
0.90	1.11	153
0.80	1.25	220
0.50	2	418
0.20	5	732
0.10	10	954
0.04	25	1,240
0.02	50	1,450
0.01	100	1,660
0.005	200	1,860

[a] Analysis includes only period of record prior to installation of flood retention dam (1964-80).

Magnitude and frequency of annual high discharges, based on period of record 1964-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	6.5	3.5	2.1	1.5
0.95	1.05	11	6.1	3.8	2.5
0.90	1.11	14	8.0	5.1	3.4
0.80	1.25	20	11	7.0	4.6
0.50	2	34	20	12	8.1
0.20	5	56	32	20	13
0.10	10	71	41	25	17
0.04	25	91	52	31	21
0.02	50	105	60	35	25
0.01	100	120	68	39	28
0.005	200	134	76	43	31

05455010 SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1964 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.08	0.17
0.10	10	0.00	0.00	0.00	0.00	0.00	0.04	0.10	0.16	0.26
0.20	5	0.00	0.00	0.00	0.00	0.03	0.10	0.19	0.27	0.42
0.50	2	0.00	0.00	0.00	0.04	0.14	0.31	0.48	0.62	0.91
0.80	1.25	0.13	0.15	0.17	0.19	0.37	0.66	0.92	1.2	1.7
0.90	1.11	0.22	0.25	0.30	0.36	0.54	0.90	1.2	1.5	2.3
0.96	1.04	0.34	0.36	0.43	0.63	0.75	1.2	1.5	2.0	2.9
0.98	1.02	0.43	0.44	0.52	0.89	0.89	1.4	1.7	2.3	3.4
0.99	1.01	0.53	0.56	0.59	1.2	1.3	1.6	1.9	2.6	3.8

Magnitude and frequency of seasonal low discharges, based on period of record October 1963 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.11
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14
0.05	20	0.00	0.00	0.00	0.02	0.00	0.00	0.06	0.21
0.10	10	0.00	0.00	0.00	0.06	0.00	0.09	0.10	0.30
0.20	5	0.00	0.00	0.01	0.13	0.09	0.17	0.20	0.47
0.50	2	0.15	0.17	0.22	0.42	0.26	0.40	0.59	1.1
0.80	1.25	0.40	0.50	0.63	1.1	0.57	0.83	1.3	2.6
0.90	1.11	0.58	0.75	0.97	1.7	0.83	1.2	1.9	4.2
0.96	1.04	0.81	1.1	1.4	2.6	1.2	1.8	2.5	6.9
0.98	1.02	0.97	1.3	1.7	3.3	1.5	2.2	3.0	9.5
0.99	1.01	1.1	1.5	2.1	4.1	1.9	2.8	3.4	13
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.08
0.50	2	0.00	0.00	0.06	0.23	0.08	0.15	0.21	0.41
0.80	1.25	0.19	0.28	0.31	0.67	0.31	0.46	0.57	0.91
0.90	1.11	0.35	0.51	0.63	1.2	0.49	0.66	0.84	1.2
0.96	1.04	0.59	0.83	1.2	2.0	0.72	0.86	1.2	1.5
0.98	1.02	0.78	1.1	1.9	2.9	0.88	0.99	1.4	1.6
0.99	1.01	0.98	1.3	2.8	4.0	1.0	1.1	1.6	1.7

05455100 OLD MANS CREEK NEAR IOWA CITY, IOWA

LOCATION.—Lat 41°36'23", long 91°36'56", in SE1/4 SW1/4 NW1/4 sec. 36, T79N, R7W, Johnson County, Hydrologic Unit 07080209, on left bank 10 ft downstream from bridge on County Highway W62, 5 miles southwest of Iowa City, 5.9 miles upstream of Dirty Face Creek, and 8.6 miles upstream from mouth.

DRAINAGE AREA.—201 mi^2.

PERIOD OF RECORD.—October 1950 to September 1964, October 1984 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 637.49 ft above sea level. Prior to November 16, 1984, nonrecording gage at same site at datum 2.00 ft higher. Prior to October 1, 1987, at datum 2.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 13,000 ft^3/s, July 6, 1993, gage height, 17.61 ft; minimum daily discharge, 0.10 ft^3/s, September 6, 1957.

Selected values from rating table number 6, developed May 1996

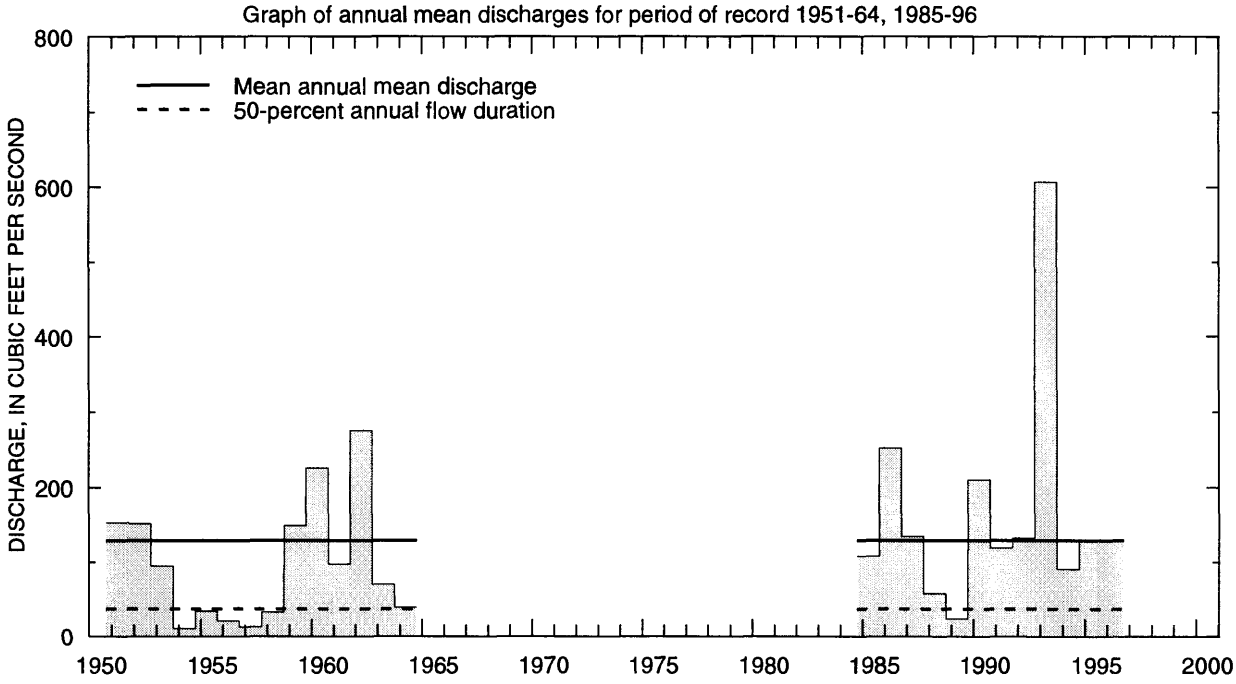
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	9.0	10.0	1,390
2.0	38.5	12.0	2,070
3.0	128	14.0	3,330
4.0	248	16.0	6,160
6.0	552	17.5	12,700
8.0	927		

05455100 OLD MANS CREEK NEAR IOWA CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1951-64, 1985-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	307	1987	0.21	1958	49.7	70.2
November	636	1962	0.39	1956	97.1	153
December	337	1993	0.35	1956	59.1	77.0
January	436	1960	0.26	1956	63.6	96.8
February	346	1953	2.50	1954	110	99.1
March	793	1962	2.12	1954	248	243
April	625	1993	1.29	1956	162	167
May	1,071	1996	4.97	1956	236	277
June	907	1990	5.34	1956	177	202
July	1,515	1993	1.43	1954	164	306
August	1,190	1993	2.97	1988	116	258
September	598	1993	0.36	1957	66.3	130
Annual	607	1993	10.3	1954	129	122

Graph of annual mean discharges for period of record 1951-64, 1985-96



05455100 OLD MANS CREEK NEAR IOWA CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1951-64, 1985-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.20	0.30	0.30	0.20	0.10	1.6	0.80	1.2	0.60	0.91	0.60	0.10	0.20
95	0.33	0.70	0.50	0.30	0.48	2.6	2.5	3.6	3.5	2.1	0.94	0.30	0.70
90	0.70	1.0	0.70	0.40	2.4	4.0	5.8	6.0	8.2	2.7	1.7	0.60	1.4
85	0.90	1.2	1.0	1.0	3.8	10	8.9	19	12	4.0	2.3	1.2	2.6
80	1.2	2.1	1.5	2.9	5.4	23	23	29	15	6.3	3.2	2.0	4.0
75	1.5	2.9	2.2	4.2	8.0	32	30	36	20	11	4.4	2.8	5.8
70	2.5	3.4	2.6	6.2	16	41	38	43	24	15	5.8	3.6	9.0
60	4.6	10	9.6	12	42	62	53	62	40	26	8.9	4.6	21
50	9.3	25	22	25	57	82	81	86	72	35	13	6.8	37
40	22	45	48	43	70	107	119	117	113	52	19	13	58
30	35	80	64	54	90	170	157	161	159	80	33	28	90
25	49	104	78	60	105	232	182	198	198	101	44	36	110
20	71	132	92	70	126	299	215	239	252	134	68	45	142
15	105	158	105	90	163	399	262	325	302	206	107	64	189
10	146	215	153	120	212	620	364	479	404	345	201	156	275
5	222	395	214	180	402	1,030	524	881	579	700	518	314	510

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 45 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	--
0.50	2	2,710
0.20	5	5,210
0.10	10	7,350
0.04	25	10,600
0.02	50	13,500
0.01	100	16,700
0.005	200	20,400

Magnitude and frequency of annual high discharges, based on period of record 1951-64, 1985-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	121	76	42	27
0.95	1.05	269	168	103	68
0.90	1.11	403	249	160	106
0.80	1.25	639	393	262	174
0.50	2	1,450	878	601	405
0.20	5	3,000	1,800	1,190	813
0.10	10	4,240	2,540	1,620	1,110
0.04	25	5,990	3,580	2,160	1,490
0.02	50	7,390	4,410	2,550	1,760
0.01	100	8,860	5,270	2,920	2,020
0.005	200	10,400	6,170	3,280	2,270

05455100 OLD MANS CREEK NEAR IOWA CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1951 to March 1964, April 1985 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.04	0.04	0.04	0.05	0.07	0.08	0.12	0.16	0.19
0.02	50	0.07	0.07	0.07	0.09	0.12	0.14	0.22	0.29	0.39
0.05	20	0.15	0.16	0.16	0.19	0.26	0.32	0.51	0.68	1.0
0.10	10	0.29	0.31	0.32	0.38	0.49	0.65	1.1	1.4	2.3
0.20	5	0.65	0.70	0.73	0.83	1.0	1.5	2.4	3.3	5.7
0.50	2	2.6	2.8	3.1	3.4	4.1	6.8	10	14	25
0.80	1.25	8.9	9.8	11	12	15	27	38	52	79
0.90	1.11	16	18	20	23	29	55	72	96	130
0.96	1.04	29	32	37	43	58	111	133	176	205
0.98	1.02	42	45	53	63	88	173	194	255	264
0.99	1.01	57	61	73	88	128	254	268	350	360

Magnitude and frequency of seasonal low discharges, based on period of record October 1950 to September 1964, October 1984 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.03	0.03	0.03	0.06	0.31	0.44	0.53	0.82
0.02	50	0.06	0.06	0.07	0.13	0.53	0.75	0.93	1.5
0.05	20	0.20	0.21	0.23	0.44	1.2	1.6	2.0	3.3
0.10	10	0.52	0.57	0.63	1.2	2.3	3.1	4.0	6.4
0.20	5	1.5	1.7	1.9	3.4	4.8	6.3	8.4	13
0.50	2	8.9	10	11	18	17	22	30	47
0.80	1.25	38	44	47	67	53	65	87	133
0.90	1.11	71	81	86	114	87	107	142	210
0.96	1.04	128	140	151	183	143	173	226	323
0.98	1.02	179	191	205	236	190	230	297	414
0.99	1.01	236	244	263	288	243	292	374	508
		July-August-September				October-November-December			
0.01	100	0.04	0.08	0.10	0.16	0.05	0.06	0.06	0.07
0.02	50	0.06	0.13	0.16	0.25	0.09	0.11	0.11	0.12
0.05	20	0.14	0.27	0.33	0.49	0.18	0.23	0.25	0.29
0.10	10	0.28	0.50	0.60	0.89	0.35	0.45	0.51	0.62
0.20	5	0.63	1.1	1.2	1.9	0.76	0.99	1.2	1.5
0.50	2	2.9	4.4	5.0	7.9	3.4	4.4	5.8	8.2
0.80	1.25	12	17	20	35	15	19	26	41
0.90	1.11	25	33	40	76	32	39	55	93
0.96	1.04	53	66	86	180	71	83	122	217
0.98	1.02	84	103	140	315	120	134	200	372
0.99	1.01	128	152	218	524	191	206	311	600

05455500 ENGLISH RIVER AT KALONA, IOWA

LOCATION.—Lat 41°28'11", long 91°42'52", in SE1/4 SE1/4 sec. 13, T77N, R8W, Washington County, Hydrologic Unit 07080209, on right bank 30 ft upstream from bridge on State Highway 1, 0.8 mi south of Kalona, 1.1 mi upstream from Camp Creek, 4.5 mi downstream from Smith Creek, and 14.5 mi upstream from mouth.

DRAINAGE AREA.—573 mi^2.

PERIOD OF RECORD.—September 1939 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 633.45 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to December 27, 1939, nonrecording gage 30 ft downstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 36,100 ft^3/s, July 6, 1993, gage height, 22.55 ft; minimum daily discharge, 0.66 ft^3/s, February 5, 1977.

Selected values from rating table number 10, developed October 1993

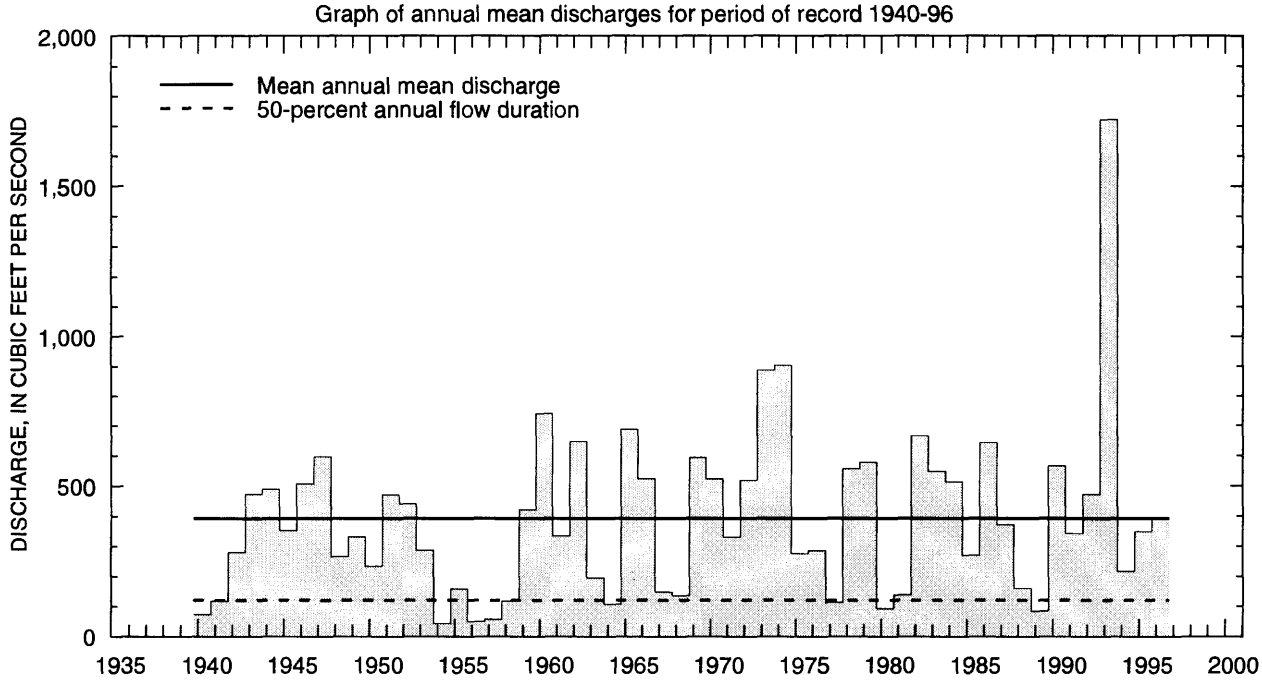
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	7.22	10.0	1,970
3.0	31.2	12.0	2,980
4.0	127	14.0	4,190
5.0	288	17.0	7,250
6.0	510	20.0	17,500
8.0	1,140	23.0	46,000

05455500 ENGLISH RIVER AT KALONA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1940-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,004	1987	2.98	1954	150	206
November	2,060	1962	2.38	1956	252	374
December	1,085	1983	2.19	1956	193	222
January	1,429	1946	0.76	1977	213	318
February	1,066	1984	13.8	1954	354	284
March	2,957	1979	10.8	1954	698	591
April	2,736	1973	5.35	1956	644	608
May	3,529	1974	9.62	1956	677	763
June	2,570	1990	21.7	1940	578	555
July	4,207	1993	7.31	1954	425	669
August	3,696	1993	6.34	1955	286	571
September	3,169	1965	3.10	1955	245	531
Annual	1,721	1993	41.7	1954	393	281

Graph of annual mean discharges for period of record 1940-96



05455500 ENGLISH RIVER AT KALONA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1940-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	2.2	2.2	2.0	0.77	1.7	9.3	5.5	7.3	2.8	3.3	3.0	2.3	2.4
95	4.3	5.2	3.6	2.5	7.0	22	26	22	19	8.0	7.3	5.0	6.0
90	6.1	7.4	5.0	5.2	16	58	61	47	32	20	11	8.0	11
85	7.5	11	8.0	11	22	79	90	74	46	30	14	10	17
80	10	17	12	20	32	101	115	93	60	40	17	13	24
75	13	24	16	26	45	130	137	112	79	51	21	15	33
70	15	30	26	31	70	166	155	138	101	64	25	18	45
60	23	45	46	45	98	220	216	194	161	89	34	24	76
50	42	69	80	80	140	278	310	268	243	118	48	33	120
40	64	120	140	122	190	364	416	380	349	159	68	52	180
30	102	203	190	160	280	552	544	520	511	225	101	83	270
25	145	256	222	180	350	693	646	628	621	288	127	109	343
20	201	333	280	210	414	885	772	774	787	387	177	143	442
15	283	412	354	260	560	1,120	984	968	994	544	254	222	591
10	406	536	451	380	800	1,760	1,430	1,440	1,410	887	439	492	860
5	653	925	650	692	1,580	2,850	2,490	3,050	2,380	1,820	1,240	1,060	1,660

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,130
0.95	1.05	1,870
0.90	1.11	2,450
0.80	1.25	3,370
0.50	2	6,170
0.20	5	11,200
0.10	10	15,100
0.04	25	20,900
0.02	50	25,600
0.01	100	30,800
0.005	200	36,400

Magnitude and frequency of annual high discharges, based on period of record 1940-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	539	281	169	119
0.95	1.05	1,070	618	397	272
0.90	1.11	1,510	907	596	406
0.80	1.25	2,230	1,400	933	632
0.50	2	4,430	2,880	1,930	1,310
0.20	5	8,100	5,260	3,400	2,360
0.10	10	10,800	6,890	4,320	3,040
0.04	25	14,300	8,880	5,360	3,850
0.02	50	16,900	10,300	6,040	4,390
0.01	100	19,600	11,600	6,630	4,890
0.005	200	22,200	12,900	7,160	5,350

05455500 ENGLISH RIVER AT KALONA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.49	0.66	0.72	0.80	0.91	1.3	1.8	2.0	3.0
0.02	50	0.71	0.92	1.0	1.1	1.3	2.0	2.8	3.0	4.9
0.05	20	1.2	1.5	1.7	1.9	2.4	3.6	5.0	5.8	9.6
0.10	10	1.9	2.3	2.6	2.9	3.8	5.9	8.4	9.9	17
0.20	5	3.4	3.8	4.3	4.9	6.7	11	15	19	32
0.50	2	9.5	10	11	13	19	31	44	57	94
0.80	1.25	25	26	29	34	47	83	118	154	233
0.90	1.11	41	43	48	55	73	134	189	249	352
0.96	1.04	69	73	79	91	116	217	306	403	521
0.98	1.02	95	102	109	125	154	293	411	540	656
0.99	1.01	127	138	145	167	197	381	531	696	794

Magnitude and frequency of seasonal low discharges, based on period of record October 1939 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.47	0.47	0.50	0.75	1.5	2.3	3.2	4.7
0.02	50	0.88	0.90	0.96	1.5	2.7	3.9	5.2	7.8
0.05	20	2.1	2.2	2.4	3.9	5.8	8.2	11	16
0.10	10	4.2	4.6	5.1	8.3	11	15	19	29
0.20	5	9.3	10	12	19	22	29	37	57
0.50	2	34	39	44	72	71	89	111	180
0.80	1.25	97	110	122	194	178	219	279	466
0.90	1.11	152	171	186	289	262	325	420	716
0.96	1.04	230	254	272	408	372	470	617	1,080
0.98	1.02	291	318	334	489	453	580	772	1,360
0.99	1.01	352	379	393	563	529	688	928	1,660
		July-August-September				October-November-December			
0.01	100	1.0	1.9	2.4	3.8	0.71	0.95	0.96	1.2
0.02	50	1.3	2.3	2.9	4.4	1.0	1.3	1.4	1.8
0.05	20	1.9	3.1	3.8	5.9	1.8	2.3	2.5	3.3
0.10	10	2.8	4.2	5.1	7.7	2.9	3.7	4.1	5.7
0.20	5	4.4	6.1	7.5	11	5.4	6.5	7.6	11
0.50	2	12	14	18	27	17	20	25	37
0.80	1.25	33	40	49	78	54	63	79	119
0.90	1.11	61	73	88	148	98	114	147	218
0.96	1.04	119	147	176	315	187	220	282	412
0.98	1.02	187	238	284	531	284	336	430	620
0.99	1.01	284	374	444	873	414	493	629	890

05455700 IOWA RIVER NEAR LONE TREE, IOWA

LOCATION.—Lat 41°25'15", long 91°28'25", in NW1/4 NE1/4 sec. 6, T76N, R5W, Louisa County, Hydrologic Unit 07080209, on left bank 2,000 ft downstream from tri-county bridge on County Highway W66, 5 mi southwest of Lone Tree, 6.2 mi downstream from English River, and at mile 47.2.

DRAINAGE AREA.—4,293 mi^2.

PERIOD OF RECORD.—October 1956 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 588.16 ft above sea level. Prior to December 28, 1956, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 57,100 ft^3/s, July 7, 1993, gage height, 22.94 ft; minimum daily discharge, 69 ft^3/s, August 4, 1977.

REMARKS.—Flow regulated since September 17, 1958, by Coralville Dam and Reservoir (station 05453510) 36.1 mi upstream. Insufficient data to compile pre-regulation statistics.

Selected values from rating table number 13, developed October 1992

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	133	9.0	5,110
4.0	591	11.0	7,650
5.0	1,240	14.0	12,100
6.0	2,030	17.0	22,000
7.0	2,950	20.0	36,600
8.0	3,980	23.0	57,600

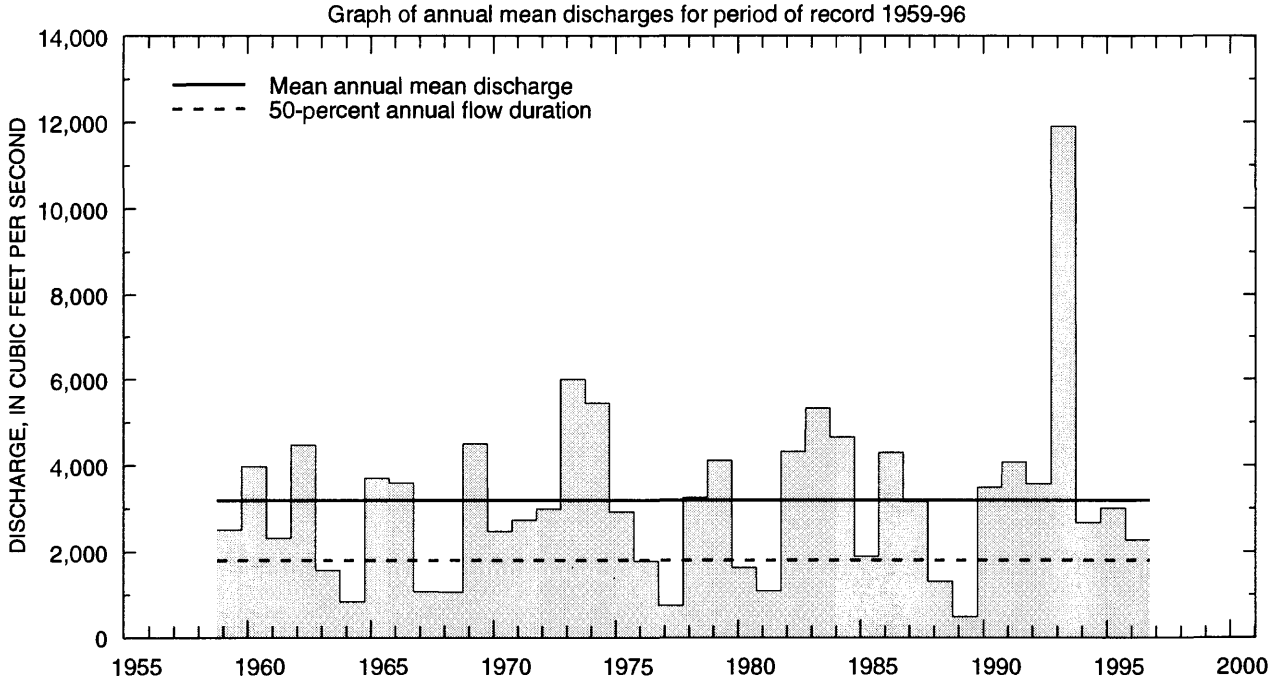
05455700 IOWA RIVER NEAR LONE TREE, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	6,115	1994	192	1989	1,557	1,481
November	6,347	1962	190	1967	2,062	1,775
December	6,678	1983	168	1989	1,960	1,627
January	7,814	1973	154	1977	1,549	1,600
February	7,205	1973	158	1977	2,411	1,541
March	10,410	1993	539	1977	4,773	2,776
April	12,230	1979	533	1989	5,172	3,597
May	14,030	1993	282	1977	4,635	3,390
June	13,150	1974	147	1977	4,624	3,361
July	30,320	1993	180	1977	4,376	5,204
August	26,150	1993	186	1989	2,941	4,410
September	18,150	1993	210	1988	2,206	3,157
Annual	11,900	1993	483	1989	3,192	2,027

Graph of annual mean discharges for period of record 1959-96



05455700 IOWA RIVER NEAR LONE TREE, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	183	176	154	148	150	246	379	216	142	83	148	169	160
95	193	190	185	180	280	503	718	406	290	247	250	209	212
90	208	217	218	215	434	779	1,020	644	602	430	319	234	313
85	223	336	380	260	582	1,020	1,310	956	760	711	415	260	440
80	266	415	468	340	730	1,290	1,540	1,150	1,180	888	531	312	589
75	451	578	598	390	858	1,690	1,780	1,430	1,500	1,060	634	363	740
70	541	744	688	470	1,000	1,990	2,050	1,840	1,860	1,310	708	418	895
60	790	1,030	1,040	720	1,250	2,720	2,730	2,600	2,860	1,800	845	564	1,260
50	988	1,400	1,360	940	1,550	3,550	3,550	3,930	4,260	2,700	1,070	741	1,800
40	1,240	1,860	1,790	1,200	1,950	4,590	5,300	5,090	5,130	4,260	1,470	1,200	2,500
30	1,750	2,450	2,380	1,600	2,400	6,350	7,050	6,100	6,170	5,240	2,960	1,950	3,820
25	2,080	2,780	2,700	1,800	2,930	7,480	8,290	6,700	6,640	6,030	4,450	2,570	4,560
20	2,490	3,520	3,120	2,100	3,400	8,370	9,420	7,290	7,090	6,440	4,990	3,770	5,340
15	3,140	4,270	3,800	2,440	4,190	9,300	10,400	7,910	7,800	7,420	5,440	4,740	6,380
10	3,810	4,870	4,570	3,400	5,820	10,100	11,100	9,410	9,200	8,580	6,380	5,140	7,650
5	4,740	5,990	5,910	6,000	8,520	11,600	12,200	11,700	12,000	12,400	9,280	7,300	10,200

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05455700 IOWA RIVER NEAR LONE TREE, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1959 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	68	70	70	75	87	88	89	102	145
0.02	50	78	81	84	90	104	106	118	135	194
0.05	20	99	104	109	118	138	152	175	203	295
0.10	10	122	130	138	151	178	207	248	290	420
0.20	5	161	172	186	205	245	303	375	440	631
0.50	2	284	304	335	374	457	621	801	944	1,280
0.80	1.25	529	563	619	700	879	1,270	1,650	1,930	2,400
0.90	1.11	750	789	864	982	1,250	1,840	2,360	2,760	3,220
0.96	1.04	1,110	1,150	1,240	1,420	1,840	2,720	3,440	3,970	4,310
0.98	1.02	1,440	1,470	1,580	1,810	2,380	3,500	4,350	4,990	5,140
0.99	1.01	1,830	1,850	1,970	2,260	3,000	4,400	5,360	6,100	6,500

Magnitude and frequency of seasonal low discharges, based on period of record
October 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	73	83	91	102	83	90	102	128
0.02	50	92	105	115	132	118	129	148	191
0.05	20	131	150	163	195	196	216	254	338
0.10	10	180	204	222	273	299	335	399	542
0.20	5	260	294	322	408	486	553	672	924
0.50	2	521	585	645	861	1,130	1,340	1,680	2,290
0.80	1.25	1,020	1,140	1,270	1,770	2,340	2,960	3,770	4,890
0.90	1.11	1,440	1,600	1,800	2,560	3,280	4,300	5,530	6,900
0.96	1.04	2,060	2,290	2,590	3,750	4,570	6,240	8,080	9,580
0.98	1.02	2,590	2,870	3,280	4,780	5,570	7,830	10,200	11,600
0.99	1.01	3,180	3,510	4,040	5,930	6,590	9,500	12,400	13,600
		July-August-September				October-November-December			
0.01	100	100	110	115	129	79	79	79	80
0.02	50	107	119	121	145	97	102	102	106
0.05	20	122	137	144	177	133	142	148	163
0.10	10	142	162	175	220	177	192	206	238
0.20	5	179	207	231	300	249	275	308	370
0.50	2	335	394	469	640	484	552	655	825
0.80	1.25	817	975	1,220	1,730	943	1,110	1,380	1,730
0.90	1.11	1,460	1,760	2,240	3,240	1,340	1,610	2,030	2,500
0.96	1.04	3,000	3,600	4,680	6,840	1,950	2,400	3,050	3,640
0.98	1.02	5,020	6,040	7,900	11,600	2,490	3,100	3,970	4,590
0.99	1.01	8,290	9,960	13,100	19,300	3,100	3,910	5,020	5,630

05457700 CEDAR RIVER AT CHARLES CITY, IOWA

LOCATION.—Lat 43°03'45", long 92°40'23", in SE1/4 NE1/4, sec. 12, T95N, R16W, Floyd County, Hydrologic Unit 07080201, on right bank 800 ft downstream from bridge on U.S. Highway 18 (Brantingham Street) in Charles City, 10.6 mi upstream from Gizzard Creek, and at mile 252.9 upstream from mouth of Iowa River.

DRAINAGE AREA.—1,054 mi^2.

PERIOD OF RECORD.—Discharge records from October 1964 to September 30, 1995. Stage only records from October 1, 1995 to September 30, 1996.

GAGE.—Water-stage recorder. Datum of gage is 973.02 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 21,000 ft^3/s, April 7, 1965, gage height, 19.14 ft; minimum daily discharge, 60 ft^3/s, November 23, 1977, and January 7, 1978.

Selected values from rating table number 4, developed October 1975
(A discharge measurement to validate this rating has not been made since September 1995)

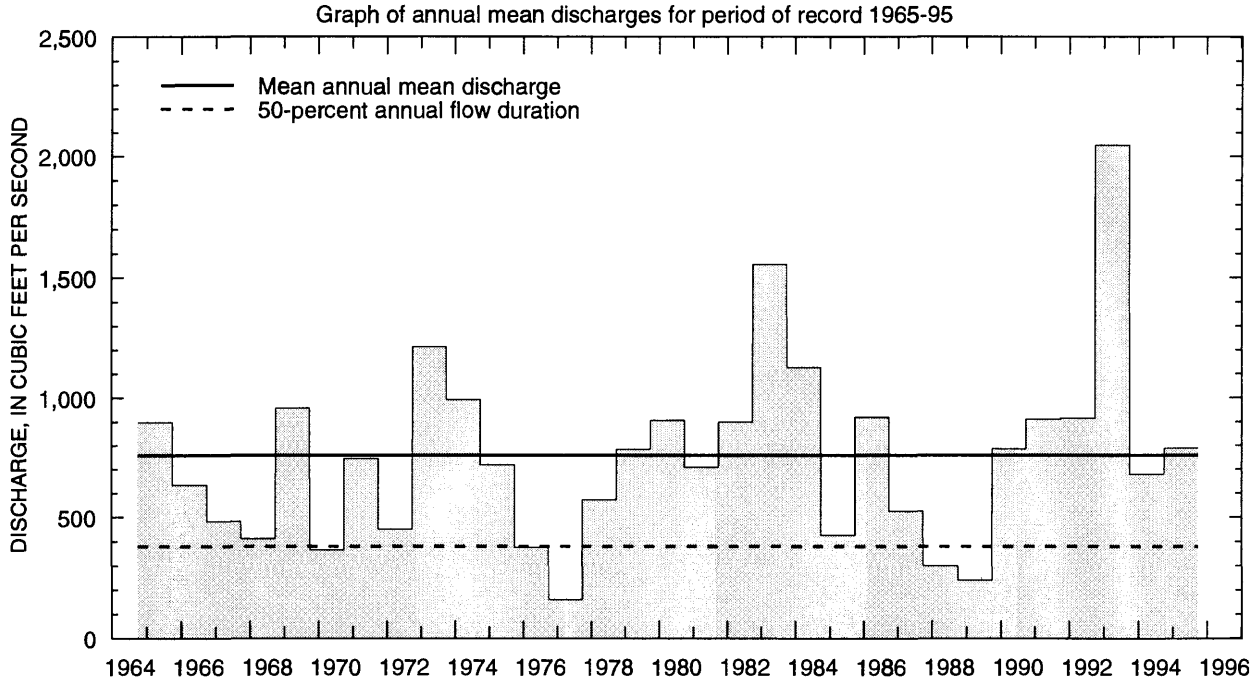
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.8	57	5.0	2,150
2.0	130	7.0	3,860
2.2	231	9.0	5,850
2.5	407	13.0	10,600
3.0	736	17.0	16,800
4.0	1,420	21.0	26,700

05457700 CEDAR RIVER AT CHARLES CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1965-95

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,339	1987	126	1977	600	542
November	1,639	1983	97.7	1977	524	405
December	1,396	1983	85.4	1990	379	285
January	888	1973	86.3	1990	277	167
February	1,707	1984	127	1990	365	340
March	3,172	1983	176	1968	1,267	784
April	5,264	1965	251	1968	1,536	1,251
May	3,434	1991	197	1977	1,039	741
June	4,071	1993	130	1977	1,003	807
July	3,009	1993	159	1988	830	707
August	4,704	1993	114	1988	711	956
September	1,670	1965	116	1976	540	430
Annual	2,048	1993	159	1977	757	389

Graph of annual mean discharges for period of record 1965-95



05457700 CEDAR RIVER AT CHARLES CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1965-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	120	81	68	80	102	105	171	164	116	108	93	89	92
95	132	129	105	96	118	153	244	218	154	138	118	121	125
90	148	154	127	115	140	193	334	288	214	170	139	162	155
85	171	172	140	123	155	234	412	339	252	202	164	181	180
80	190	194	168	140	166	260	458	375	289	239	184	195	200
75	204	210	181	155	176	300	510	412	346	272	208	209	222
70	217	224	196	173	187	353	576	457	383	311	228	222	247
60	255	290	250	200	210	480	723	562	488	405	265	244	305
50	315	381	310	240	225	630	923	685	650	469	305	286	380
40	460	439	360	270	250	866	1,150	885	829	543	346	353	482
30	604	529	410	300	290	1,230	1,480	1,130	1,010	720	443	447	660
25	698	606	443	325	320	1,500	1,770	1,270	1,150	847	522	512	797
20	834	761	484	346	350	1,850	2,080	1,430	1,290	1,010	684	655	971
15	1,040	886	567	380	394	2,410	2,690	1,690	1,550	1,300	1,020	833	1,230
10	1,330	1,080	680	470	519	3,150	3,180	2,100	1,930	1,660	1,580	1,160	1,630
5	1,880	1,490	959	600	909	4,580	4,340	2,950	2,980	2,850	2,840	1,730	2,640

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 41 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,540
0.90	1.11	3,500
0.80	1.25	5,030
0.50	2	9,350
0.20	5	15,800
0.10	10	20,200
0.04	25	25,400
0.02	50	29,100
0.01	100	32,600
0.005	200	36,000

Magnitude and frequency of annual high discharges, based on period of record 1965-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	538	462	353	295
0.95	1.05	1,280	989	751	606
0.90	1.11	1,920	1,420	1,070	851
0.80	1.25	2,960	2,130	1,590	1,230
0.50	2	5,870	4,130	2,990	2,240
0.20	5	9,680	7,000	4,870	3,540
0.10	10	11,800	8,790	5,970	4,270
0.04	25	13,900	10,800	7,150	5,040
0.02	50	15,200	12,100	7,890	5,520
0.01	100	16,300	13,300	8,530	5,920
0.005	200	17,100	14,400	9,080	6,260

05457700 CEDAR RIVER AT CHARLES CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1965 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	43	46	50	53	61	73	80	81	81
0.02	50	51	55	59	63	71	84	91	94	97
0.05	20	65	70	75	80	89	102	111	116	126
0.10	10	80	86	91	97	107	121	133	140	159
0.20	5	100	107	114	120	133	147	164	175	209
0.50	2	147	156	165	173	191	214	244	270	347
0.80	1.25	202	212	224	234	259	306	360	418	568
0.90	1.11	233	242	256	268	298	366	439	526	729
0.96	1.04	266	274	291	304	341	441	543	673	946
0.98	1.02	288	294	314	326	369	496	621	790	1,120
0.99	1.01	307	312	333	346	394	550	701	912	1,290

Magnitude and frequency of seasonal low discharges, based on period of record October 1964 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	55	65	70	79	81	85	88	102
0.02	50	63	73	78	89	96	102	106	125
0.05	20	77	87	92	105	124	133	139	168
0.10	10	91	101	107	122	155	168	178	218
0.20	5	111	122	129	146	203	221	237	298
0.50	2	160	174	184	206	338	371	409	530
0.80	1.25	222	246	263	287	555	612	695	925
0.90	1.11	261	295	317	341	717	790	913	1,230
0.96	1.04	307	358	388	409	938	1,030	1,210	1,650
0.98	1.02	340	405	443	460	1,110	1,220	1,460	1,990
0.99	1.01	371	453	499	510	1,300	1,420	1,720	2,340
		July-August-September				October-November-December			
0.01	100	86	95	104	107	49	56	60	70
0.02	50	92	100	109	113	57	66	70	81
0.05	20	102	110	118	124	72	84	90	101
0.10	10	114	122	129	138	88	104	111	123
0.20	5	133	140	147	162	112	134	143	158
0.50	2	188	198	207	238	181	215	233	258
0.80	1.25	288	309	334	402	295	339	375	429
0.90	1.11	373	408	455	559	381	428	479	565
0.96	1.04	504	568	662	833	501	546	621	761
0.98	1.02	623	718	865	1,110	600	636	734	925
0.99	1.01	761	899	1,120	1,450	705	730	852	1,110

05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA

LOCATION.—Lat 43°02'05", long 92°30'05", in SW1/4 NE1/4 sec. 21, T95N, R14W, Chickasaw County, Hydrologic Unit 07080201, on left bank 12 ft downstream from bridge on County Highway B57, 2.4 mi west of Ionia, 6.4 mi upstream from mouth, and 7.6 mi downstream from Beaver Creek.

DRAINAGE AREA.—306 mi^2.

PERIOD OF RECORD.—October 1954 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 973.35 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 14,000 ft^3/s, August 16, 1993, gage height, 18.99 ft; minimum daily discharge, 3.0 ft^3/s, February 4–9, 1959.

Selected values from rating table number 12 developed October 1996

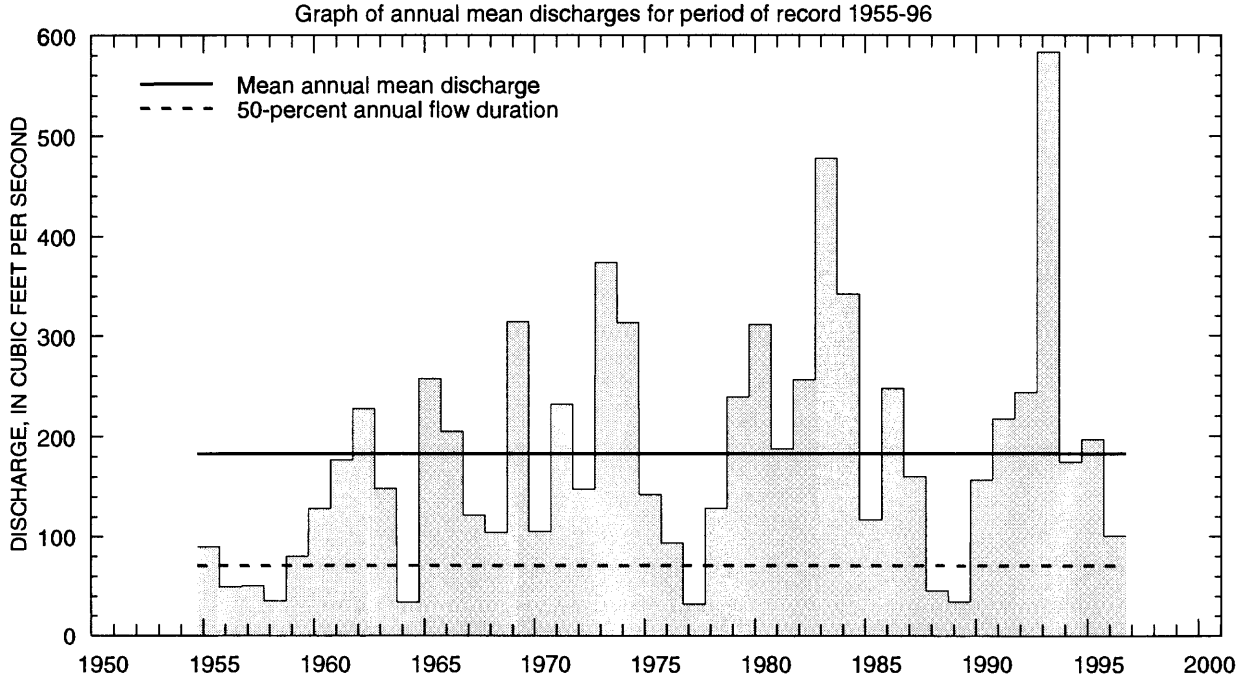
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.2	3.00	7.0	1,200
3.0	29.5	9.0	2,240
4.0	170	12.0	4,350
5.0	447	15.0	7,090
6.0	793	19.0	11,600

05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1955-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	902	1987	9.64	1990	148	185
November	632	1983	12.4	1990	125	140
December	503	1983	4.93	1990	79.3	89.6
January	265	1973	4.20	1959	48.7	50.7
February	643	1984	3.40	1959	83.0	118
March	1,056	1961	34.5	1964	369	268
April	1,466	1965	47.3	1957	354	319
May	906	1991	30.5	1958	232	199
June	1,136	1969	18.4	1989	263	288
July	959	1993	14.2	1964	171	185
August	1,744	1993	7.23	1989	177	325
September	807	1965	12.7	1988	141	180
Annual	584	1993	32.0	1977	183	121

Graph of annual mean discharges for period of record 1955-96



05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1955-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.6	8.2	3.8	3.4	3.3	6.0	34	24	15	10	6.1	7.5	5.8
95	13	14	8.2	5.7	6.8	20	47	36	21	16	11	13	12
90	18	18	12	7.0	11	26	59	46	28	22	17	18	18
85	21	23	15	11	13	32	73	59	39	28	22	24	24
80	24	26	21	14	16	39	91	70	47	33	28	28	28
75	26	30	26	16	20	48	110	77	54	38	32	31	32
70	32	34	30	20	22	63	126	88	65	46	36	34	38
60	47	50	38	25	27	97	155	106	90	66	46	39	52
50	61	70	49	31	32	145	196	133	117	87	55	49	71
40	81	93	60	40	40	200	251	169	153	108	66	65	97
30	124	116	84	54	53	308	322	229	204	136	81	93	137
25	152	135	94	60	61	370	368	259	238	161	93	114	166
20	191	162	104	68	72	473	453	301	281	193	118	151	208
15	238	217	132	76	99	661	578	383	358	244	169	184	270
10	340	271	161	91	146	1,000	729	508	500	348	303	241	384
5	575	414	224	128	283	1,500	1,080	738	873	678	696	392	684

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 43 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	241
0.95	1.05	528
0.90	1.11	784
0.80	1.25	1,240
0.50	2	2,780
0.20	5	5,730
0.10	10	8,110
0.04	25	11,500
0.02	50	14,200
0.01	100	17,000
0.005	200	20,000

Magnitude and frequency of annual high discharges, based on period of record 1955-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	127	103	69	53
0.95	1.05	308	234	159	122
0.90	1.11	475	350	239	182
0.80	1.25	774	553	378	283
0.50	2	1,780	1,210	816	585
0.20	5	3,600	2,350	1,550	1,050
0.10	10	4,950	3,180	2,060	1,350
0.04	25	6,720	4,260	2,710	1,700
0.02	50	8,040	5,060	3,170	1,940
0.01	100	9,330	5,850	3,610	2,150
0.005	200	10,600	6,620	4,030	2,350

05458000 LITTLE CEDAR RIVER NEAR IONIA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1955 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.0	2.0	2.0	2.0	2.3	3.0	3.7	4.7	5.3
0.02	50	2.7	2.7	2.7	2.8	3.1	4.0	4.9	6.2	7.1
0.05	20	4.2	4.2	4.3	4.5	5.0	6.2	7.6	9.3	11
0.10	10	6.0	6.1	6.3	6.6	7.3	9.0	11	13	16
0.20	5	9.2	9.4	9.8	10	11	14	17	20	25
0.50	2	19	20	21	22	24	30	37	43	57
0.80	1.25	35	37	39	41	47	59	75	87	129
0.90	1.11	46	50	52	55	64	82	106	123	195
0.96	1.04	61	66	69	73	86	114	151	177	301
0.98	1.02	71	78	81	86	102	139	189	222	396
0.99	1.01	82	90	93	98	119	165	229	271	506

Magnitude and frequency of seasonal low discharges, based on period of record October 1954 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.2	2.3	2.3	2.7	8.5	9.7	10	14
0.02	50	3.0	3.1	3.2	3.6	11	12	13	17
0.05	20	4.6	4.7	4.9	5.6	15	17	19	25
0.10	10	6.6	6.9	7.2	8.2	20	23	26	34
0.20	5	10	11	11	13	29	33	37	48
0.50	2	21	23	24	27	55	62	71	96
0.80	1.25	41	45	48	56	101	115	135	185
0.90	1.11	56	63	67	79	138	156	186	259
0.96	1.04	77	88	94	112	191	215	258	367
0.98	1.02	92	107	115	139	234	263	319	458
0.99	1.01	108	127	137	168	281	314	383	558
		July-August-September				October-November-December			
0.01	100	4.4	4.8	5.1	6.1	3.1	3.3	3.4	4.2
0.02	50	5.6	6.1	6.5	7.7	4.1	4.5	4.7	5.7
0.05	20	8.0	8.8	9.3	11	6.3	7.0	7.4	8.7
0.10	10	11	12	13	14	9.0	10	11	13
0.20	5	16	17	18	21	14	16	17	20
0.50	2	30	32	35	41	29	34	38	43
0.80	1.25	53	58	63	81	57	68	76	92
0.90	1.11	70	77	84	116	81	94	107	133
0.96	1.04	92	102	113	170	113	130	151	195
0.98	1.02	109	122	135	216	140	158	185	249
0.99	1.01	127	142	158	269	169	188	221	307

05458500 CEDAR RIVER AT JANESVILLE, IOWA

LOCATION.—Lat 42°38'54", long 92°27'54", in NE1/4 SW1/4 sec. 35, T91N, R14W, Bremer County, Hydrologic Unit 07080201, on left bank 300 ft downstream from bridge on county highway at Janesville, 3.6 mi upstream from West Fork Cedar River, and at mile 207.7 upstream from mouth of Iowa River.

DRAINAGE AREA.—1,661 mi^2.

PERIOD OF RECORD.—October 1904 to September 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to September 1996. Monthly discharge only for some periods, published in WSP 1308. Published as Red Cedar River at Janesville, 1905-06.

GAGE.—Water-stage recorder. Datum of gage is 868.26 ft above sea level. Prior to July 26, 1919, nonrecording gage at site 1,000 ft downstream at datum 4.0 ft lower. July 26, 1919 to September 30, 1927, November 14, 1932 to September 30, 1942, and April 26, 1946 to November 10, 1949, nonrecording gage at county bridge 300 ft upstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 37,000 ft^3/s, March 28, 1961, gage height, 16.33 ft; minimum daily discharge, 28 ft^3/s, October 21, 1922.

Selected values from rating table number 9, developed October 1992

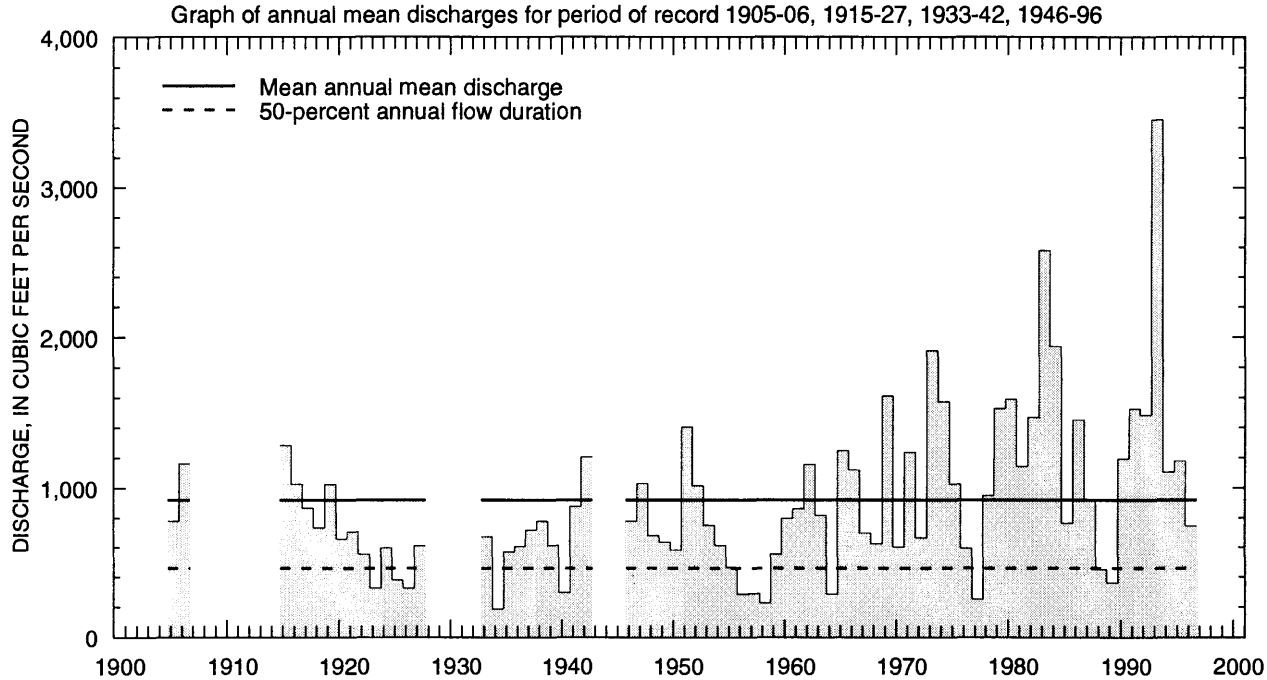
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	187	7.0	6,630
2.0	838	9.0	9,980
3.0	1,940	11.0	14,400
4.0	3,110	13.0	20,400
5.0	4,250	15.0	30,500
6.0	5,380	16.5	40,000

05458500 CEDAR RIVER AT JANESVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1905-06, 1915-27, 1933-42, 1946-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,793	1987	101	1935	618	668
November	2,672	1983	121	1934	581	531
December	2,404	1983	75.2	1934	432	403
January	1,293	1983	80.3	1917	342	259
February	3,394	1984	61.2	1959	541	520
March	4,851	1973	124	1934	1,842	1,145
April	8,966	1993	247	1957	1,803	1,682
May	5,668	1991	134	1934	1,205	993
June	6,223	1993	95.2	1934	1,273	1,034
July	6,024	1993	84.7	1934	954	974
August	7,762	1993	83.6	1934	780	1,164
September	2,805	1993	117	1934	629	571
Annual	3,454	1993	187	1934	918	542

Graph of annual mean discharges for period of record 1905-06, 1915-27, 1933-42, 1946-96



05458500 CEDAR RIVER AT JANESVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1905-06, 1915-27, 1933-42, 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	88	87	70	75	58	117	197	140	101	82	81	78	79
95	134	142	95	90	90	190	294	210	168	145	134	134	124
90	155	168	120	100	115	240	367	288	218	182	158	160	160
85	178	184	140	110	140	297	432	331	268	216	186	188	189
80	197	200	160	135	160	380	525	392	324	254	210	215	218
75	217	221	176	150	194	460	595	470	384	291	232	242	246
70	237	237	200	162	210	542	661	541	446	334	255	277	281
60	290	288	240	200	250	773	824	660	604	440	320	326	360
50	350	380	300	242	300	954	1,000	790	754	560	386	378	459
40	427	475	350	300	370	1,310	1,300	953	990	727	480	437	600
30	554	618	450	370	460	1,840	1,700	1,170	1,310	920	565	541	800
25	653	691	505	420	540	2,250	2,050	1,360	1,530	1,040	632	630	940
20	800	785	580	460	620	2,720	2,470	1,620	1,800	1,210	749	717	1,150
15	1,010	910	681	540	774	3,430	3,000	2,010	2,160	1,430	961	880	1,460
10	1,270	1,270	875	640	1,000	4,540	3,840	2,620	2,740	1,930	1,320	1,190	2,020
5	1,980	1,710	1,250	920	1,800	6,140	5,440	3,760	3,940	3,070	2,670	2,080	3,260

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 76 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,270
0.95	1.05	2,490
0.90	1.11	3,490
0.80	1.25	5,120
0.50	2	10,000
0.20	5	18,100
0.10	10	23,800
0.04	25	31,300
0.02	50	37,000
0.01	100	42,500
0.005	200	48,000

Magnitude and frequency of annual high discharges, based on period of record 1905-06, 1915-27, 1933-42, 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	962	799	590	451
0.95	1.05	1,920	1,520	1,120	841
0.90	1.11	2,680	2,080	1,530	1,140
0.80	1.25	3,930	2,960	2,170	1,600
0.50	2	7,500	5,440	3,890	2,820
0.20	5	12,900	9,120	6,290	4,500
0.10	10	16,500	11,500	7,780	5,530
0.04	25	20,900	14,500	9,500	6,720
0.02	50	24,000	16,500	10,700	7,520
0.01	100	27,000	18,500	11,700	8,250
0.005	200	29,700	20,300	12,700	8,920

05458500 CEDAR RIVER AT JANESVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1905 to March 1906, April 1915 to March 1927, April 1933 to March 1942, April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	30	38	40	43	51	60	65	75	80
0.02	50	36	45	47	51	59	70	76	87	94
0.05	20	48	57	60	65	75	87	96	109	121
0.10	10	62	71	75	81	92	107	119	135	152
0.20	5	83	93	98	105	118	137	154	175	202
0.50	2	143	155	163	174	193	226	260	293	356
0.80	1.25	241	256	269	287	318	378	449	505	644
0.90	1.11	313	332	349	372	414	499	602	679	887
0.96	1.04	411	439	459	491	552	675	829	939	1,260
0.98	1.02	488	524	549	587	665	824	1,020	1,160	1,590
0.99	1.01	568	615	644	690	788	987	1,240	1,410	1,960

Magnitude and frequency of seasonal low discharges based on period of record October 1904 to September 1906, October 1914 to September 1927, October 1932 to September 1942, October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s)							
		Number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	42	44	48	52	57	80	89	108
0.02	50	50	52	56	62	70	98	108	131
0.05	20	64	67	72	79	95	133	145	176
0.10	10	79	84	89	99	125	172	187	229
0.20	5	103	111	117	131	175	235	256	315
0.50	2	171	186	195	226	330	422	465	582
0.80	1.25	283	313	330	395	622	743	840	1,080
0.90	1.11	366	412	436	533	865	992	1,140	1,490
0.96	1.04	482	550	587	738	1,230	1,340	1,580	2,100
0.98	1.02	575	664	713	912	1,540	1,630	1,950	2,630
0.99	1.01	674	786	850	1,110	1,890	1,930	2,360	3,210
		July-August-September				October-November-December			
0.01	100	48	68	79	97	38	56	60	69
0.02	50	57	79	89	107	46	65	69	80
0.05	20	72	97	108	126	61	82	87	99
0.10	10	90	118	130	149	79	101	108	122
0.20	5	118	151	163	185	106	130	140	159
0.50	2	202	248	264	297	187	218	237	272
0.80	1.25	356	420	449	523	325	377	416	489
0.90	1.11	484	560	605	728	430	508	567	677
0.96	1.04	676	769	847	1,070	576	706	797	975
0.98	1.02	843	949	1,060	1,390	695	877	1,000	1,240
0.99	1.01	1,030	1,150	1,310	1,780	820	1,070	1,230	1,560

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA

LOCATION.—Lat 42°37'50", long 92°32'24", in SW1/4 SE1/4 sec. 6, T90N, R14W, Black Hawk County, Hydrologic Unit 07080204, on left bank 100 ft downstream from bridge on County Highway C55 at Finchford, 3.2 mi upstream from Shell Rock River, and 5.0 mi upstream from mouth.

DRAINAGE AREA.—846 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996. Prior to October 1955, published as West Fork Shell Rock River at Finchford.

GAGE.—Water-stage recorder. Datum of gage is 867.54 ft above sea level. Prior to June 10, 1955, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 31,900 ft^3/s, June 27, 1951, gage height 17.28 ft, from flood marks; maximum gage height, 18.45 ft, July 29, 1990; minimum daily discharge, 5.9 ft^3/s, February 26, 27, 1959.

Selected values from rating table number 11, developed October 1986

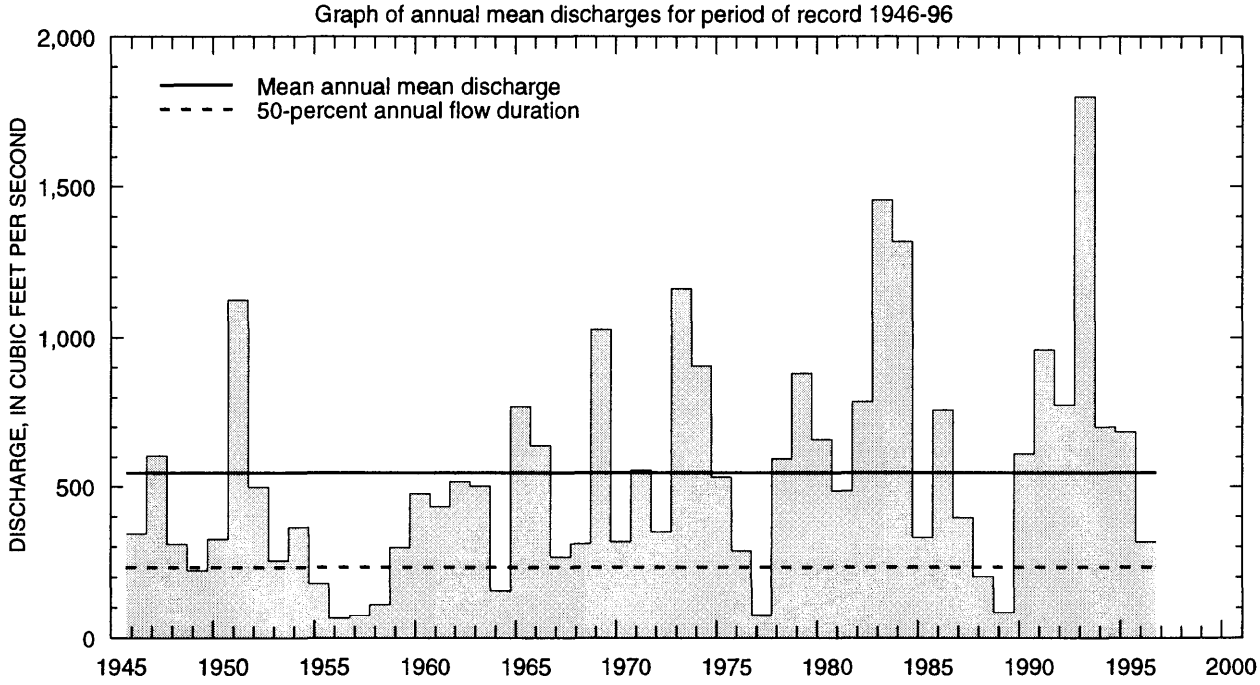
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.3	12.3	8.0	953
4.5	28.9	9.0	1,400
5.0	101	11.0	2,780
5.5	196	13.0	6,450
6.0	303	15.0	13,900
7.0	584	17.3	30,000

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,412	1973	14.9	1990	321	363
November	1,502	1973	22.3	1959	315	321
December	1,165	1983	14.2	1959	246	255
January	995	1973	9.35	1959	167	188
February	2,303	1984	6.37	1959	297	428
March	2,456	1961	86.2	1954	1,013	720
April	4,170	1965	81.8	1957	1,036	960
May	3,434	1991	80.1	1957	788	732
June	3,358	1984	39.5	1977	946	867
July	3,995	1993	26.6	1977	709	833
August	3,023	1993	15.2	1989	378	540
September	2,149	1965	16.9	1989	321	440
Annual	1,800	1993	65.5	1956	545	374

Graph of annual mean discharges for period of record 1946-96



05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	13	19	12	8.2	6.4	35	75	51	34	23	14	14	13
95	21	26	21	13	16	76	108	93	67	36	31	22	27
90	27	39	33	21	25	98	150	129	100	78	43	30	45
85	40	55	48	35	41	120	203	164	131	107	60	39	60
80	47	65	56	44	47	138	278	212	170	128	83	51	79
75	57	78	68	50	56	182	312	272	210	149	98	62	99
70	71	97	88	57	64	232	355	305	255	170	109	72	118
60	125	148	125	80	87	350	467	372	364	231	140	99	163
50	160	212	150	100	104	479	605	452	476	324	164	128	233
40	225	276	193	122	154	708	823	602	640	454	210	173	329
30	318	364	268	170	219	1,010	1,090	799	916	654	271	256	464
25	398	405	316	200	250	1,180	1,310	952	1,090	783	328	313	573
20	515	453	365	249	310	1,420	1,530	1,140	1,330	970	422	378	722
15	674	534	440	281	400	1,800	1,800	1,380	1,620	1,210	589	487	949
10	801	679	585	360	597	2,540	2,270	1,780	2,200	1,520	832	684	1,310
5	1,100	1,030	768	530	1,100	3,830	3,080	2,650	3,350	2,500	1,690	1,250	2,060

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 53 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	318
0.95	1.05	798
0.90	1.11	1,260
0.80	1.25	2,120
0.50	2	5,260
0.20	5	11,600
0.10	10	16,800
0.04	25	24,100
0.02	50	30,000
0.01	100	36,000
0.005	200	42,300

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	269	226	182	136
0.95	1.05	686	567	442	336
0.90	1.11	1,080	881	675	514
0.80	1.25	1,790	1,440	1,080	819
0.50	2	4,190	3,210	2,320	1,730
0.20	5	8,420	6,120	4,250	3,040
0.10	10	11,500	8,090	5,500	3,830
0.04	25	15,300	10,400	6,950	4,700
0.02	50	18,100	12,100	7,920	5,240
0.01	100	20,800	13,500	8,800	5,710
0.005	200	23,300	14,900	9,590	6,110

05458900 WEST FORK CEDAR RIVER AT FINCHFORD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.3	4.5	4.6	4.9	5.4	6.4	7.8	9.1	10
0.02	50	6.1	6.3	6.5	6.8	7.7	9.1	11	13	14
0.05	20	9.8	10	10	11	13	15	18	21	24
0.10	10	15	15	16	17	19	23	27	32	38
0.20	5	23	24	25	27	30	36	44	53	64
0.50	2	52	54	56	60	68	84	104	125	159
0.80	1.25	104	107	112	120	138	175	225	273	360
0.90	1.11	144	147	154	165	191	246	325	397	533
0.96	1.04	197	201	210	225	262	346	471	577	790
0.98	1.02	237	242	254	271	316	425	589	725	1,000
0.99	1.01	278	284	297	316	370	506	715	883	1,230

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4.8	5.1	5.4	6.2	19	21	23	31
0.02	50	6.8	7.2	7.5	8.7	26	29	32	41
0.05	20	11	12	12	14	41	45	49	63
0.10	10	17	18	19	21	59	65	72	91
0.20	5	28	29	31	35	92	102	114	142
0.50	2	66	70	73	85	206	230	259	326
0.80	1.25	141	153	163	195	435	489	559	732
0.90	1.11	201	223	239	295	629	710	820	1,110
0.96	1.04	284	324	353	450	919	1,040	1,220	1,710
0.98	1.02	350	407	448	586	1,160	1,320	1,550	2,260
0.99	1.01	419	496	551	738	1,430	1,620	1,930	2,890
		July-August-September				October-November-December			
0.01	100	9.6	10	11	13	5.8	6.7	7.3	8.6
0.02	50	12	13	14	16	8.1	9.4	10	12
0.05	20	17	18	20	23	13	15	17	20
0.10	10	23	25	27	32	20	23	25	30
0.20	5	34	37	40	47	33	37	41	49
0.50	2	74	79	87	105	78	89	97	118
0.80	1.25	163	178	197	251	171	198	216	266
0.90	1.11	248	275	307	406	249	293	320	396
0.96	1.04	393	444	501	690	365	435	477	594
0.98	1.02	531	607	691	983	462	556	610	765
0.99	1.01	698	809	927	1,360	566	687	756	953

05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IOWA

LOCATION.—Lat 43°24'51", long 93°13'14", in NW1/4 NW1/4 sec. 9, T99N, R20W, Worth County, Hydrologic Unit 07080202, on right bank 50 ft downstream from bridge on County Highway A27, 1.3 mi downstream from Drainage Ditch 2, 2.0 mi south of Northwood, 3.7 mi upstream from Elk Creek and 84.5 mi upstream from mouth.

DRAINAGE AREA.—300 mi^2.

PERIOD OF RECORD.—October 1945 to September 30, 1986 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,176.48 ft above sea level. Prior to May 17, 1956, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 3,400 ft^3/s, April 8, 1965, gage height, 12.07 ft; no flow January 14-19, 26-30, 1977.

Selected values from rating table number 3, developed October 1967
(A discharge measurement to validate this rating has not been made since September 1986)

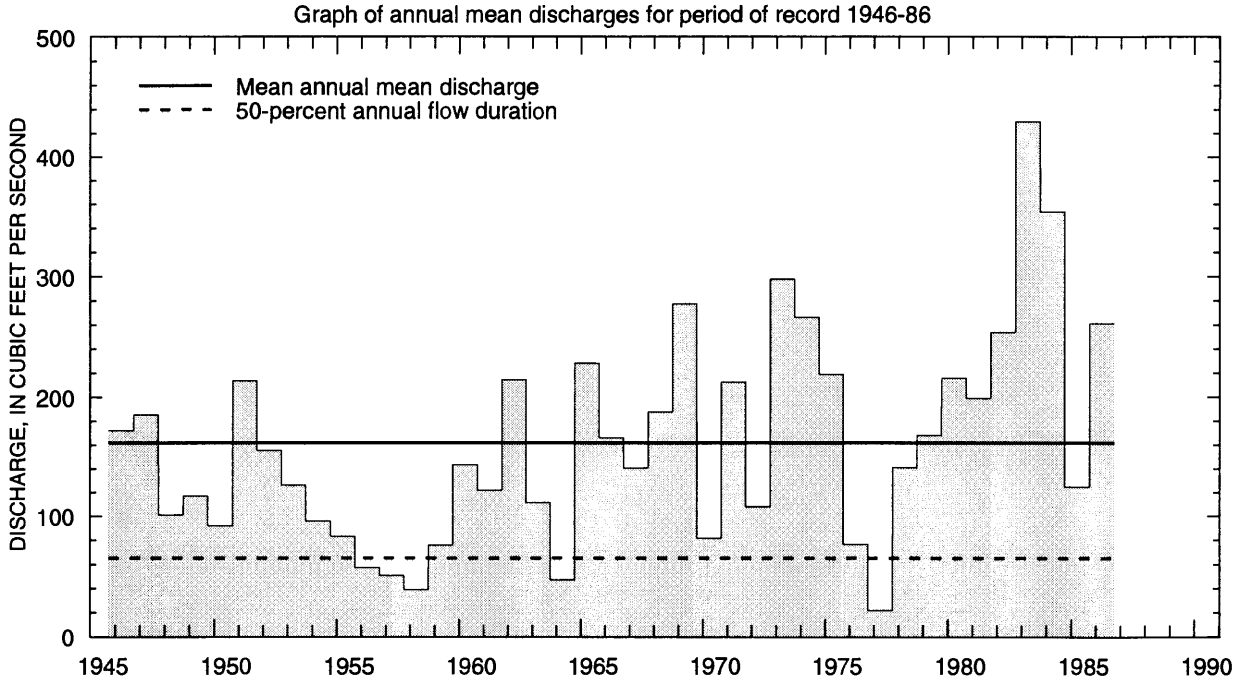
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	8.40	6.0	535
3.7	19.8	7.0	901
4.0	48.1	9.0	1,880
4.5	138	11.0	3,250
5.0	255		

05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-86

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	520	1969	9.10	1977	109	132
November	470	1983	8.08	1959	96.1	100
December	383	1983	3.76	1959	69.3	69.1
January	203	1983	0.18	1977	45.8	41.3
February	584	1984	0.42	1959	67.5	103
March	1,048	1973	27.1	1959	295	252
April	1,606	1965	34.7	1957	438	358
May	879	1984	29.9	1977	244	194
June	608	1975	14.8	1977	214	162
July	674	1969	9.61	1964	168	161
August	803	1968	5.41	1964	102	155
September	369	1968	7.21	1976	89.2	98.0
Annual	430	1983	21.7	1977	162	88.8

Graph of annual mean discharges for period of record 1946-86



05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-86

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.8	8.0	3.4	0.01	0.24	2.6	27	20	13	6.7	3.9	5.9	3.3
95	13	12	9.6	2.7	7.8	23	47	35	24	14	8.2	10	12
90	16	18	16	12	11	27	85	55	34	18	14	16	18
85	18	20	20	15	15	32	111	69	41	23	18	18	21
80	20	23	22	17	18	38	134	80	48	28	21	20	24
75	22	26	25	21	20	46	152	97	58	34	24	22	28
70	24	30	28	22	23	54	177	109	70	44	26	24	33
60	31	40	34	25	26	74	222	134	94	68	32	29	46
50	41	50	46	31	31	135	278	166	128	94	43	36	65
40	70	86	56	40	38	230	366	199	180	130	52	44	98
30	114	105	76	50	52	318	479	247	245	186	65	66	144
25	132	118	86	56	60	400	567	280	287	217	79	86	181
20	159	131	98	64	66	500	682	345	335	261	102	125	230
15	204	179	125	80	90	637	856	442	411	302	130	178	295
10	275	232	142	104	120	838	1,030	567	520	396	200	267	412
5	452	311	199	130	185	1,100	1,310	781	725	612	539	363	661

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 41 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	245
0.95	1.05	413
0.90	1.11	535
0.80	1.25	719
0.50	2	1,200
0.20	5	1,880
0.10	10	2,310
0.04	25	2,830
0.02	50	3,190
0.01	100	3,540
0.005	200	3,860

Magnitude and frequency of annual high discharges, based on period of record 1946-86

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	131	114	90	77
0.95	1.05	282	245	193	155
0.90	1.11	403	349	278	216
0.80	1.25	592	515	412	314
0.50	2	1,080	953	773	580
0.20	5	1,660	1,510	1,250	945
0.10	10	1,970	1,820	1,510	1,170
0.04	25	2,260	2,140	1,800	1,410
0.02	50	2,430	2,330	1,970	1,580
0.01	100	2,570	2,490	2,110	1,720
0.005	200	2,680	2,630	2,230	1,850

05459000 SHELL ROCK RIVER NEAR NORTHWOOD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1986

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.03	0.70	1.9	2.9	4.7
0.02	50	0.00	0.00	0.00	0.00	0.15	1.4	3.0	4.3	6.2
0.05	20	1.2	1.2	1.3	1.4	1.6	3.3	5.7	7.3	9.5
0.10	10	3.2	3.3	3.5	3.9	4.1	6.5	9.4	11	14
0.20	5	7.2	7.5	8.0	8.7	10	13	16	18	21
0.50	2	18	19	20	22	29	31	36	41	47
0.80	1.25	27	27	29	31	36	49	64	78	102
0.90	1.11	29	30	31	33	37	55	78	103	150
0.96	1.04	30	31	32	34	37	58	93	133	224
0.98	1.02	31	31	33	35	37	59	100	154	289
0.99	1.01	31	31	33	35	37	60	106	174	361

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1986

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.04	8.2	10	13	15
0.02	50	0.00	0.00	0.00	0.16	9.9	13	15	19
0.05	20	1.4	1.5	1.6	1.7	13	17	20	26
0.10	10	4.0	4.2	4.5	4.6	17	22	26	35
0.20	5	9.6	10	11	13	24	30	35	49
0.50	2	27	29	30	41	48	58	68	96
0.80	1.25	47	48	50	54	100	118	137	188
0.90	1.11	54	55	58	57	151	175	202	268
0.96	1.04	58	60	62	64	238	270	309	391
0.98	1.02	60	61	64	66	322	359	409	499
0.99	1.01	61	62	65	67	426	468	531	622
		July-August-September				October-November-December			
0.01	100	4.0	4.7	5.1	5.4	2.6	3.3	3.8	4.6
0.02	50	4.7	5.4	5.9	6.4	3.5	4.3	4.9	6.0
0.05	20	6.1	6.9	7.5	8.3	5.4	6.5	7.3	8.8
0.10	10	7.8	8.7	9.4	11	7.7	9.2	10	12
0.20	5	11	12	12	15	12	14	15	19
0.50	2	19	21	23	29	26	29	33	40
0.80	1.25	36	41	45	60	54	60	68	84
0.90	1.11	51	60	66	91	77	86	98	123
0.96	1.04	74	91	103	145	110	124	144	184
0.98	1.02	96	120	139	198	138	157	184	237
0.99	1.01	121	156	183	266	168	192	229	297

05459500 WINNEBAGO RIVER AT MASON CITY, IOWA

LOCATION.—Lat 43°09'54", long 93°11'33", in NE1/4 NW1/4 sec. 3, T96N, R20W, Cerro Gordo County, Hydrologic Unit 07080203, on right bank 650 ft upstream from Thirteenth Street Bridge in Mason City, 0.1 mi downstream from Clamus Creek, 1.0 mi upstream from Willow Creek, and at mile 275.8 upstream from mouth of Iowa River.

DRAINAGE AREA.—526 mi^2.

PERIOD OF RECORD.—October 1932 to September 1996. Prior to December 1932, monthly discharge only, published in WSP 1308. Prior to October 1959, published as Lime Creek at Mason City.

GAGE.—Water-stage recorder and concrete control. Datum of gage is 1,069.59 ft above sea level. Prior to October 15, 1934, nonrecording gage at datum 6.47 ft lower. October 15 to November 6, 1934, nonrecording gage at different datum, and November 7, 1934, to March 22, 1935, nonrecording gage at present datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,800 ft^3/s, March 30, 1933, gage height, 15.70 ft; minimum daily discharge, 1.2 ft^3/s, August 19, 1989.

Selected values from rating table number 6, developed October 1979

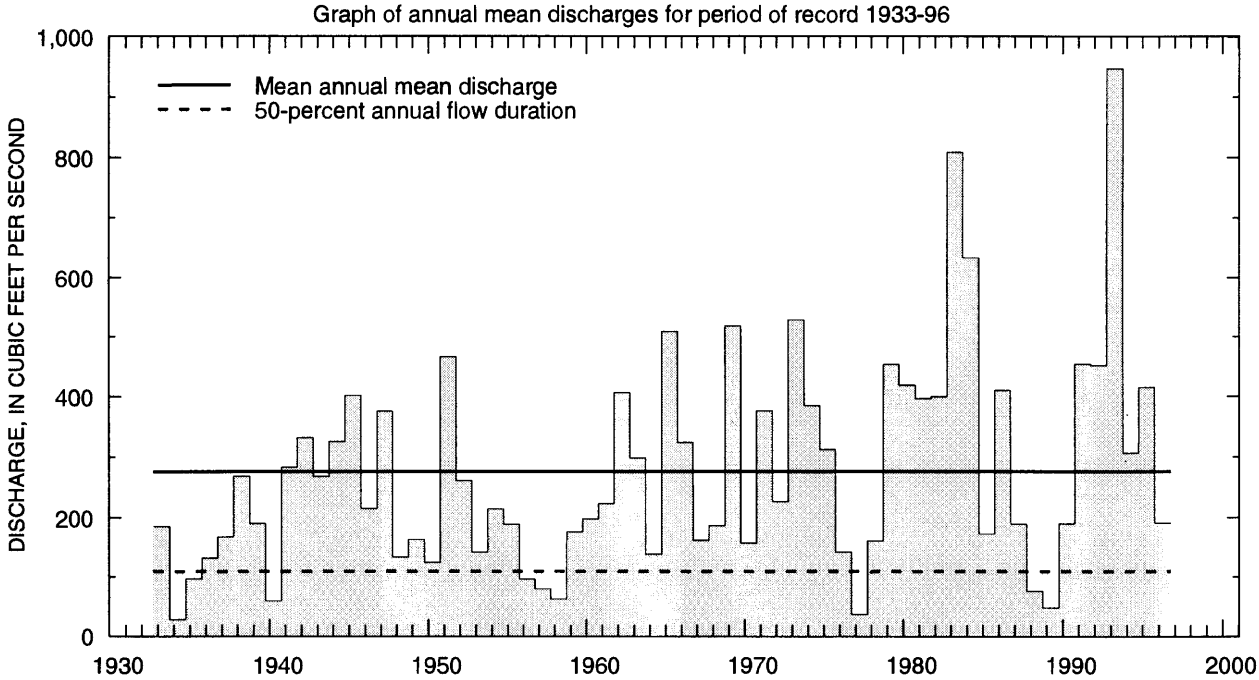
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.8	4.7	5.0	793
3.0	27	6.0	1,410
3.3	88	8.0	2,940
3.5	143	10.0	4,700
4.0	316	12.0	6,600
4.5	540	13.0	6,600

05459500 WINNEBAGO RIVER AT MASON CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1933-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	840	1966	11.3	1935	175	208
November	811	1942	12.7	1934	167	184
December	724	1983	7.45	1934	111	128
January	378	1983	6.61	1977	75.0	80.2
February	1,002	1984	7.50	1959	114	165
March	1,707	1973	17.6	1934	515	381
April	2,880	1965	61.0	1957	594	584
May	1,807	1991	16.1	1934	401	351
June	2,160	1993	21.9	1934	466	429
July	1,915	1993	7.29	1934	293	348
August	2,054	1979	4.89	1934	215	331
September	1,073	1938	12.6	1933	184	234
Annual	947	1993	28.1	1934	276	179

Graph of annual mean discharges for period of record 1933-96



05459500 WINNEBAGO RIVER AT MASON CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1933-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	7.2	9.8	4.8	5.2	6.5	11	38	19	13	6.0	4.3	7.5	7.0
95	14	16	12	9.4	9.6	19	66	45	24	14	12	13	13
90	19	21	16	12	12	34	91	68	41	25	17	16	19
85	23	24	20	14	15	48	122	86	59	35	24	21	26
80	26	30	24	17	19	62	148	106	79	44	30	27	32
75	30	34	28	20	23	82	177	125	101	59	37	35	41
70	37	40	30	25	26	101	210	150	120	70	46	42	50
60	49	55	42	30	34	171	272	190	164	101	60	56	73
50	65	81	58	41	46	254	356	230	228	140	80	70	109
40	102	136	84	56	60	367	475	300	336	200	105	92	161
30	188	189	128	78	80	550	608	410	474	278	141	134	239
25	232	216	150	90	96	672	711	491	566	322	173	168	295
20	280	251	166	109	114	829	857	608	672	404	225	230	379
15	356	313	200	132	154	1,030	1,040	762	857	508	314	314	503
10	472	423	251	160	215	1,340	1,290	950	1,180	683	541	465	700
5	646	580	350	256	400	1,790	1,860	1,350	1,690	1,130	953	740	1,110

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 64 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	990
0.90	1.11	1,300
0.80	1.25	1,790
0.50	2	3,180
0.20	5	5,420
0.10	10	7,040
0.04	25	9,180
0.02	50	10,800
0.01	100	12,500
0.005	200	14,200

Magnitude and frequency of annual high discharges, based on period of record 1933-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	329	230	154	116
0.95	1.05	604	450	316	237
0.90	1.11	819	625	447	335
0.80	1.25	1,160	905	659	491
0.50	2	2,150	1,700	1,260	930
0.20	5	3,720	2,890	2,140	1,560
0.10	10	4,820	3,670	2,700	1,960
0.04	25	6,230	4,620	3,360	2,420
0.02	50	7,280	5,280	3,810	2,730
0.01	100	8,320	5,910	4,210	3,010
0.005	200	9,340	6,500	4,590	3,270

05459500 WINNEBAGO RIVER AT MASON CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1933 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.5	1.9	2.4	2.8	3.3	4.2	4.9	5.7	5.9
0.02	50	2.1	2.6	3.2	3.7	4.3	5.5	6.4	7.5	8.0
0.05	20	3.6	4.2	4.9	5.5	6.4	8.1	9.6	11	13
0.10	10	5.5	6.2	7.1	7.8	9.0	11	14	16	19
0.20	5	8.9	9.8	11	12	13	17	21	24	30
0.50	2	20	22	23	25	28	37	46	55	75
0.80	1.25	41	43	46	50	58	77	101	124	178
0.90	1.11	56	60	64	70	83	113	152	189	277
0.96	1.04	75	82	89	99	120	167	231	296	441
0.98	1.02	89	100	110	123	152	215	303	395	594
0.99	1.01	103	118	131	149	186	268	386	512	774

Magnitude and frequency of seasonal low discharges, based on period of record October 1932 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.2	3.8	4.0	4.7	6.6	8.2	9.5	14
0.02	50	4.1	4.7	5.0	5.9	9.0	11	13	19
0.05	20	6.0	6.7	7.1	8.3	14	18	21	30
0.10	10	8.3	9.1	9.6	11	22	26	31	44
0.20	5	12	13	14	17	35	42	49	69
0.50	2	26	28	29	35	83	98	115	160
0.80	1.25	53	59	63	76	188	219	259	353
0.90	1.11	77	88	95	114	283	326	387	526
0.96	1.04	115	135	148	179	431	490	586	793
0.98	1.02	149	180	198	241	561	634	761	1,030
0.99	1.01	188	232	258	315	707	794	957	1,290
		July-August-September				October-November-December			
0.01	100	1.7	3.5	4.0	4.9	2.4	3.5	4.3	5.4
0.02	50	2.6	4.7	5.3	6.5	3.3	4.6	5.6	7.0
0.05	20	4.6	7.4	8.2	9.9	5.4	7.1	8.4	10
0.10	10	7.6	11	12	14	8.2	10	12	15
0.20	5	13	17	19	23	13	16	19	23
0.50	2	34	39	42	53	33	39	44	54
0.80	1.25	75	83	92	123	76	91	105	127
0.90	1.11	107	122	136	190	116	141	164	200
0.96	1.04	150	180	203	299	178	224	266	326
0.98	1.02	183	230	262	401	232	302	365	448
0.99	1.01	216	284	327	521	293	395	484	598

05460500 SHELL ROCK RIVER AT MARBLE ROCK, IOWA

LOCATION.—Lat 42°57'55", long 92°52'15", in SE1/4 SE1/4 sec. 8, T94N, R17W, Floyd County, Hydrologic Unit 07080202, on left wingwall of dam at Marble Rock, 0.5 mi upstream from unnamed creek entering from right bank and 10 mi downstream from Lime Creek.

DRAINAGE AREA.—1,318 mi^2.

PERIOD OF RECORD.—October 1942 to September 1953 (discontinued).

GAGE.—Staff gage read once daily, more often at high stages. Datum of gage is 961.17 ft above sea level. October 1, 1942 to March 12, 1945 and June 6, 1946 to June 19, 1950, water-stage recorder at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 22,700 ft^3/s, April 7, 1951, gage height, 3.83 ft; minimum daily discharge, 6 ft^3/s, January 20, 23, 30, 31, 1935.

REMARKS.—Record combined with record from gaging-station six miles downstream, 05461000 Shell Rock River at Greene, Iowa (period of record—July 1933 to September 1942) and statistics computed on combined record.

Selected values from rating table developed January 1953
(A discharge measurement to validate this rating has not been made since October 1953)

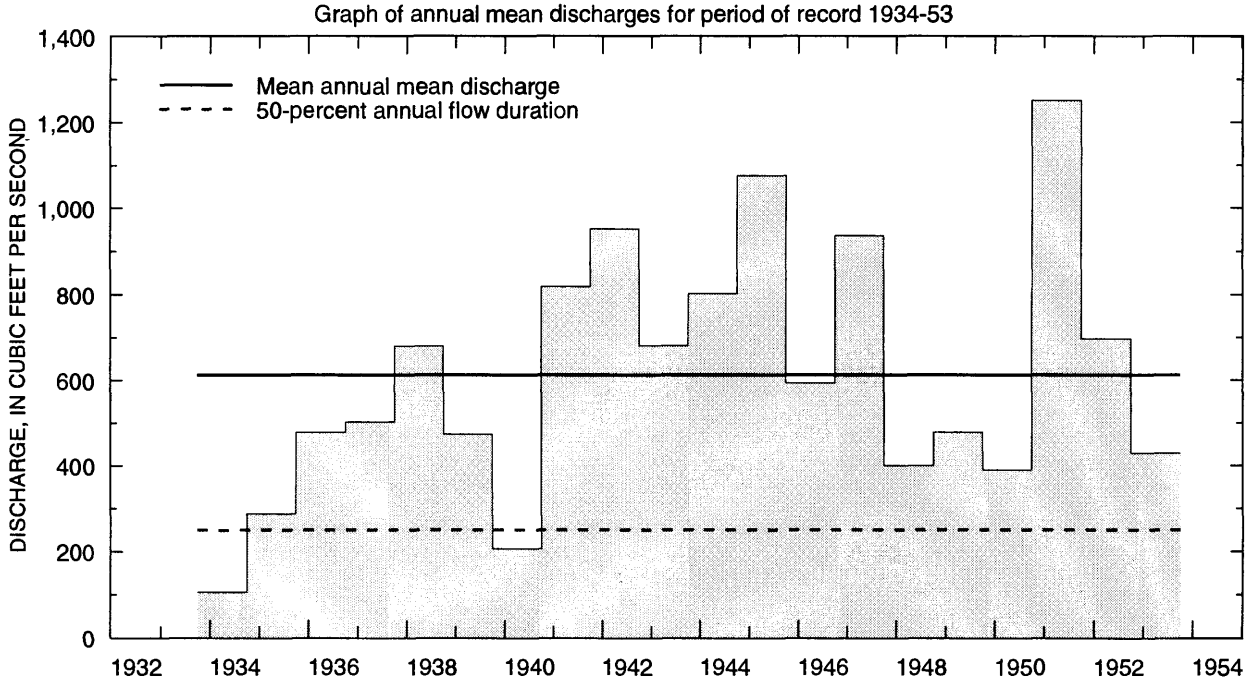
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
0.5	125	4.0	4,930
0.7	242	5.0	7,050
1.0	469	6.0	9,410
1.5	950	7.0	12,100
2.0	1,550	8.0	15,000
3.0	3,060		

05460500 SHELL ROCK RIVER AT MARBLE ROCK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1934-53

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	964	1942	53.6	1935	256	238
November	1,762	1942	54.1	1934	319	395
December	598	1942	47.6	1934	180	144
January	589	1942	41.8	1935	181	152
February	975	1948	34.0	1936	301	244
March	3,070	1936	65.3	1934	1,519	810
April	6,465	1951	370	1940	1,338	1,367
May	2,712	1944	47.5	1934	819	682
June	2,700	1947	55.8	1934	1,065	931
July	1,830	1947	36.2	1934	535	474
August	1,298	1945	28.9	1934	420	405
September	2,136	1938	67.0	1934	402	480
Annual	1,252	1951	105	1934	612	296

Graph of annual mean discharges for period of record 1934-53



05460500 SHELL ROCK RIVER AT MARBLE ROCK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1934-53

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	31	28	28	18	27	37	107	28	28	15	15	25	25
95	53	50	50	36	39	73	249	66	64	37	36	57	48
90	64	65	61	47	47	145	342	155	96	51	68	72	64
85	75	80	68	54	53	221	405	202	132	89	88	83	80
80	87	91	76	62	60	332	450	244	149	118	105	87	92
75	99	96	82	68	64	433	501	280	186	135	123	96	107
70	110	107	87	75	73	595	564	327	248	153	140	112	127
60	130	127	96	84	91	716	664	447	406	232	164	141	183
50	169	169	111	100	115	950	810	540	537	344	201	185	250
40	196	208	150	131	190	1,290	994	659	700	468	252	257	375
30	238	270	202	215	253	1,700	1,290	803	1,000	600	362	341	549
25	290	340	232	232	316	2,000	1,530	894	1,240	664	449	408	663
20	373	420	255	258	383	2,340	1,810	1,040	1,550	773	623	486	805
15	445	509	304	322	450	2,860	2,290	1,360	1,930	939	749	618	1,030
10	554	813	409	372	648	3,500	2,880	1,790	2,750	1,200	1,070	957	1,460
5	742	1,050	516	496	906	5,000	3,960	2,890	4,380	1,750	1,670	1,340	2,400

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 21 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,270
0.95	1.05	3,500
0.90	1.11	4,380
0.80	1.25	5,730
0.50	2	9,440
0.20	5	15,300
0.10	10	19,400
0.04	25	25,100
0.02	50	29,400
0.01	100	34,000
0.005	200	38,600

Magnitude and frequency of annual high discharges, based on period of record 1934-53

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2,070	1,560	885	525
0.95	1.05	2,740	2,040	1,290	850
0.90	1.11	3,190	2,360	1,570	1,080
0.80	1.25	3,840	2,840	1,980	1,420
0.50	2	5,550	4,110	3,020	2,270
0.20	5	8,100	6,070	4,490	3,420
0.10	10	9,920	7,520	5,480	4,140
0.04	25	12,400	9,520	6,720	5,000
0.02	50	14,300	11,100	7,630	5,590
0.01	100	16,300	12,800	8,540	6,150
0.005	200	18,400	14,600	9,450	6,670

05460500 SHELL ROCK RIVER AT MARBLE ROCK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1934 to March 1953

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	4.6	11	17	19	20	25	29	32	32
0.02	50	6.3	13	20	21	23	29	33	39	39
0.05	20	10	17	24	27	29	36	42	48	52
0.10	10	15	22	30	33	36	45	51	59	68
0.20	5	23	31	38	42	46	58	66	77	93
0.50	2	50	56	63	68	77	97	113	132	178
0.80	1.25	97	102	107	115	132	169	201	243	351
0.90	1.11	132	140	144	154	176	229	278	342	507
0.96	1.04	178	195	198	210	242	320	399	503	758
0.98	1.02	214	242	245	259	298	401	507	652	989
0.99	1.01	249	294	299	313	361	492	634	829	1,260

Magnitude and frequency of seasonal low discharges, based on period of record July 1933 to September 1953

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4.5	20	21	22	9.9	21	21	29
0.02	50	6.4	23	24	25	16	30	31	41
0.05	20	10	28	30	32	30	49	52	68
0.10	10	16	35	37	39	51	74	80	104
0.20	5	26	45	48	52	90	118	130	168
0.50	2	60	78	83	95	219	258	288	383
0.80	1.25	125	144	154	187	424	492	545	770
0.90	1.11	177	206	219	277	552	656	719	1,060
0.96	1.04	249	307	327	432	692	860	927	1,440
0.98	1.02	305	403	429	584	780	1,010	1,070	1,730
0.99	1.01	363	520	552	774	853	1,140	1,200	2,010
		July-August-September				October-November-December			
0.01	100	8.6	16	19	24	8.7	27	31	34
0.02	50	12	20	24	29	11	30	34	39
0.05	20	18	29	32	39	16	36	40	47
0.10	10	26	39	43	51	21	42	48	56
0.20	5	40	55	60	71	31	53	59	71
0.50	2	87	107	114	140	63	89	98	121
0.80	1.25	175	198	217	290	128	164	178	223
0.90	1.11	245	270	304	432	185	236	254	318
0.96	1.04	344	371	436	668	273	360	383	479
0.98	1.02	423	454	550	894	349	482	509	635
0.99	1.01	505	541	678	1,170	437	635	666	826

05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA

LOCATION.—Lat 42°42'43", long 92°34'58", in NW1/4 NE1/4 sec. 11, T91N, R15W, Butler County, Hydrologic Unit 07080202, on right bank 400 ft upstream from bridge on County Highway C45 in Shell Rock, 2.2 mi downstream from Curry Creek, and 10.4 mi upstream from mouth.

DRAINAGE AREA.—1,746 mi^2.

PERIOD OF RECORD.—June 1953 to September 1996. Prior to July 1953, monthly discharge only, published in WSP 1728.

GAGE.—Water-stage recorder. Rockfill dam since October 19, 1957. Datum of gage is 885.34 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 33,500 ft^3/s, March 28, 1961, gage height, 16.26 ft; minimum daily discharge, 27 ft^3/s, December 22, 1989.

Selected values from rating table number 17, developed October 1988

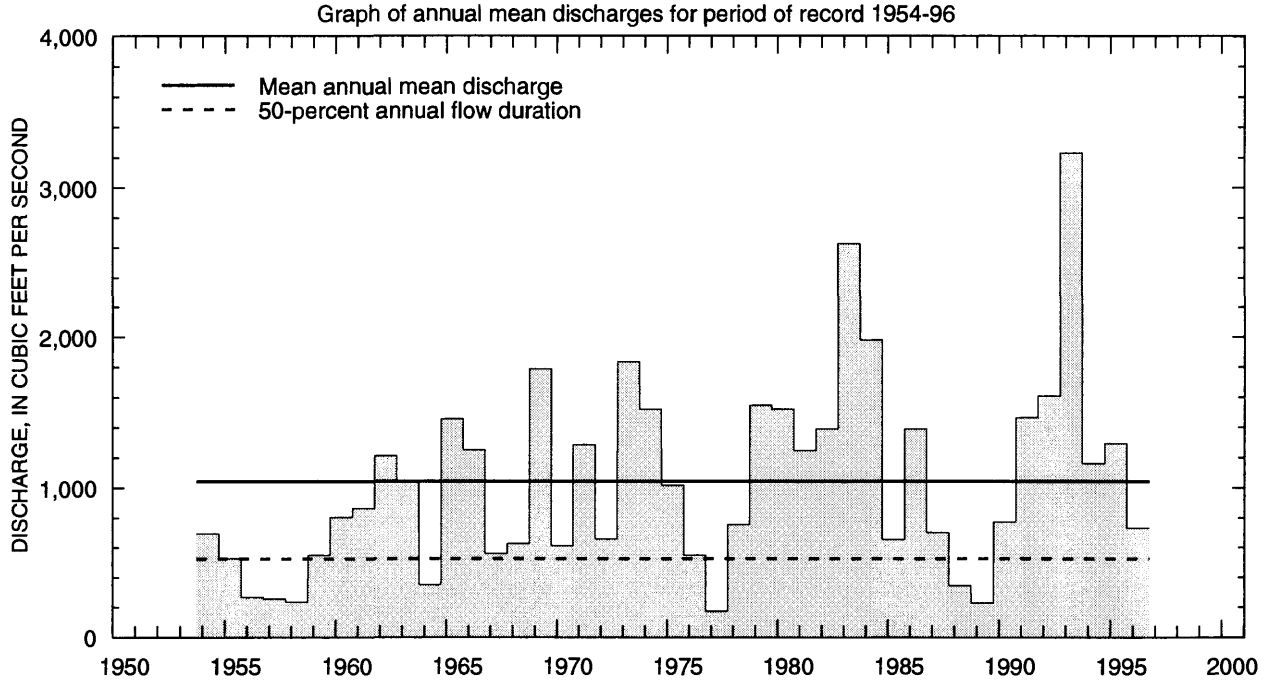
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.0	57.5	10.0	3,250
7.5	215	11.0	5,840
8.0	514	12.0	9,210
8.5	947	14.0	19,000
9.0	1,550	16.0	32,600

05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1954-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,544	1987	74.1	1990	759	690
November	2,326	1983	77.7	1990	691	594
December	2,381	1983	39.8	1990	524	483
January	1,375	1983	45.6	1959	351	302
February	2,833	1984	44.7	1959	483	563
March	5,426	1992	193	1968	1,629	1,343
April	8,540	1965	226	1957	1,999	1,833
May	5,889	1991	243	1958	1,545	1,252
June	6,239	1993	138	1977	1,658	1,291
July	6,461	1993	114	1977	1,218	1,251
August	5,637	1979	66.7	1989	894	1,217
September	2,816	1993	96.6	1989	725	723
Annual	3,231	1993	171	1977	1,041	649

Graph of annual mean discharges for period of record 1954-96



05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1954-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	71	63	34	44	41	82	167	148	104	80	64	75	56
95	96	101	80	58	68	165	259	235	174	133	98	99	101
90	128	133	100	86	103	193	328	329	260	202	149	130	147
85	157	163	152	105	120	220	475	413	351	266	188	154	184
80	185	202	180	130	140	250	603	492	428	314	214	180	216
75	210	236	207	160	164	310	710	566	520	367	236	222	251
70	242	268	239	181	180	397	808	640	644	426	272	255	296
60	340	370	300	206	216	568	971	830	813	565	355	320	400
50	434	502	353	245	253	767	1,240	1,020	1,040	750	452	392	526
40	614	628	470	314	314	1,070	1,650	1,280	1,400	958	530	480	712
30	932	797	590	400	411	1,480	2,160	1,660	1,770	1,230	654	621	970
25	1,080	858	650	445	450	1,800	2,570	1,920	2,050	1,410	756	728	1,160
20	1,230	988	722	490	507	2,500	2,910	2,320	2,410	1,600	906	870	1,440
15	1,470	1,240	862	539	664	3,190	3,400	2,820	2,790	1,910	1,230	1,200	1,790
10	1,810	1,560	1,020	668	860	4,310	4,300	3,510	3,550	2,480	2,030	1,660	2,440
5	2,210	2,030	1,450	1,000	1,450	5,930	5,750	4,780	5,140	4,100	3,650	2,630	3,700

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 48 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	884
0.95	1.05	1,830
0.90	1.11	2,620
0.80	1.25	3,980
0.50	2	8,260
0.20	5	15,800
0.10	10	21,400
0.04	25	29,000
0.02	50	34,800
0.01	100	40,800
0.005	200	46,700

Magnitude and frequency of annual high discharges, based on period of record 1954-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	605	488	377	318
0.95	1.05	1,340	1,070	810	665
0.90	1.11	1,980	1,570	1,180	953
0.80	1.25	3,070	2,420	1,800	1,430
0.50	2	6,440	5,020	3,710	2,850
0.20	5	12,000	9,250	6,840	5,100
0.10	10	15,900	12,200	9,030	6,640
0.04	25	20,700	15,800	11,800	8,530
0.02	50	24,200	18,400	13,800	9,880
0.01	100	27,600	20,900	15,700	11,200
0.005	200	30,800	23,200	17,600	12,400

05462000 SHELL ROCK RIVER AT SHELL ROCK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1954 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	22	22	24	26	31	37	38	44	47
0.02	50	28	30	32	35	41	48	50	57	62
0.05	20	40	44	47	51	59	69	74	84	94
0.10	10	54	61	65	71	81	94	103	116	134
0.20	5	77	88	95	103	116	134	151	168	201
0.50	2	146	167	177	190	212	246	289	327	412
0.80	1.25	261	287	301	317	351	417	509	593	786
0.90	1.11	345	368	382	399	442	533	663	788	1,070
0.96	1.04	458	466	479	495	550	678	859	1,050	1,460
0.98	1.02	535	536	547	562	624	782	1,000	1,240	1,760
0.99	1.01	600	602	611	623	694	883	1,140	1,440	2,070

Magnitude and frequency of seasonal low discharges, based on period of record July 1953 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	27	30	32	38	45	68	74	97
0.02	50	33	38	40	47	61	87	95	124
0.05	20	47	53	56	65	93	126	138	180
0.10	10	63	71	76	86	133	174	191	249
0.20	5	88	101	107	119	204	255	282	366
0.50	2	165	190	201	222	442	516	578	752
0.80	1.25	298	341	362	405	903	1,010	1,160	1,510
0.90	1.11	399	456	485	551	1,280	1,410	1,640	2,150
0.96	1.04	540	612	654	761	1,840	2,000	2,380	3,120
0.98	1.02	652	735	788	935	2,300	2,500	3,000	3,950
0.99	1.01	770	863	929	1,120	2,800	3,040	3,690	4,870
		July-August-September				October-November-December			
0.01	100	35	54	63	65	26	30	31	36
0.02	50	43	64	73	76	35	40	42	49
0.05	20	59	83	92	98	52	62	65	75
0.10	10	79	104	114	125	74	89	94	107
0.20	5	111	139	149	167	111	134	144	162
0.50	2	212	245	260	307	223	271	297	335
0.80	1.25	405	445	475	592	414	497	554	635
0.90	1.11	568	615	665	853	556	657	737	861
0.96	1.04	814	876	967	1,280	744	860	972	1,160
0.98	1.02	1,030	1,110	1,240	1,680	887	1,010	1,150	1,390
0.99	1.01	1,270	1,370	1,560	2,150	1,030	1,150	1,320	1,630

05463000 BEAVER CREEK AT NEW HARTFORD, IOWA

LOCATION.—Lat 42°34'22", long 92°37'04", in SE1/4 SE1/4 sec. 28, T90N, R15W, Butler County, Hydrologic Unit 07080205, on right bank 5 ft from right end of bridge on County Highway T55, 0.2 mi north of New Hartford, and 8 mi upstream from mouth.

DRAINAGE AREA.—347 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996. Prior to April 1948, monthly discharge only, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 882.44 ft above sea level. Prior to July 14, 1959, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 18,000 ft^3/s, June 13, 1947, gage height, 13.50 ft; minimum daily discharge, 2.0 ft^3/s, September 30, 1989.

Selected values from rating table number 10, developed October 1996

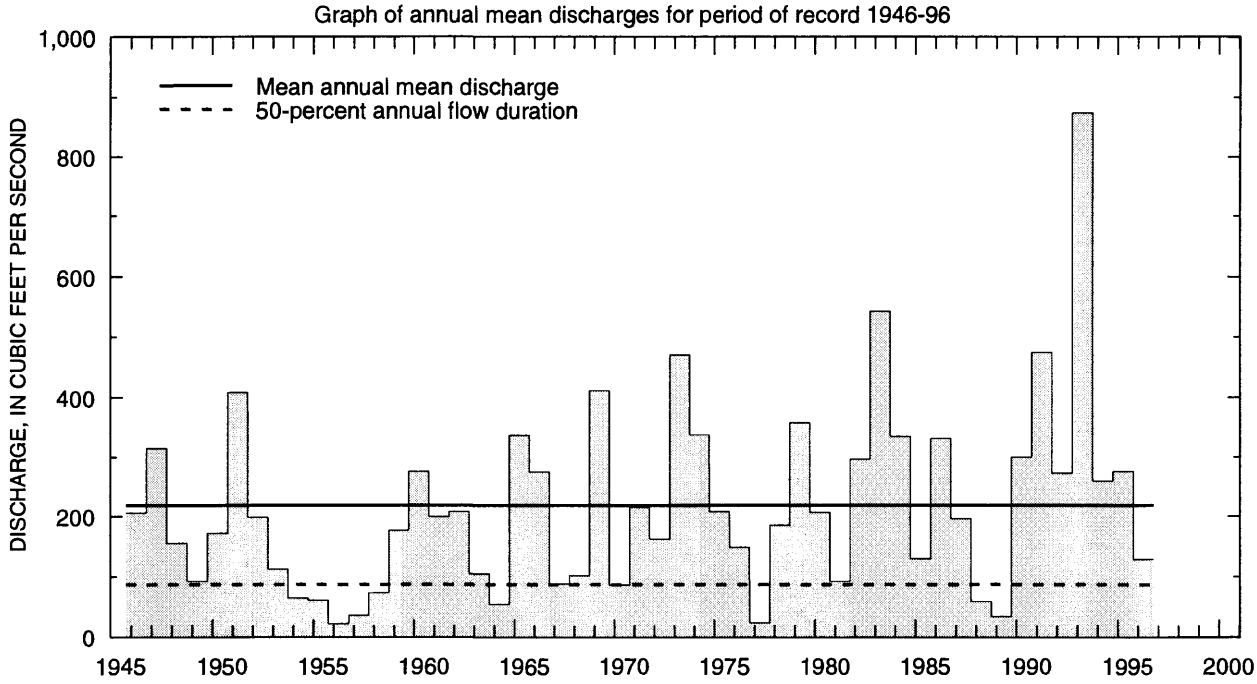
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	19.5	5.0	422
2.5	56.9	6.0	665
3.0	103	8.0	1,350
3.5	162	10.0	3,240
4.0	235	11.5	6,300

05463000 BEAVER CREEK AT NEW HARTFORD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	495	1987	4.98	1957	119	133
November	673	1973	8.80	1957	124	130
December	514	1983	7.13	1990	87.1	94.5
January	403	1946	2.88	1956	73.9	87.7
February	651	1983	3.84	1956	150	164
March	1,606	1993	28.1	1954	468	373
April	1,578	1993	33.8	1954	386	367
May	1,606	1991	23.2	1977	317	326
June	2,213	1947	12.5	1956	380	422
July	1,686	1993	4.47	1956	259	332
August	1,368	1993	4.22	1989	147	228
September	1,028	1965	6.02	1988	111	174
Annual	874	1993	21.8	1956	219	158

Graph of annual mean discharges for period of record 1946-96



05463000 BEAVER CREEK AT NEW HARTFORD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	4.2	8.6	4.3	2.8	3.6	17	26	18	9.5	4.0	3.7	4.2	4.3
95	8.3	14	8.0	4.9	5.8	28	37	29	20	9.9	8.4	8.5	9.4
90	15	17	9.6	6.6	10	36	57	44	37	28	16	13	16
85	19	21	14	9.0	14	45	71	56	48	39	22	18	22
80	21	24	17	12	15	59	90	68	57	48	29	22	28
75	24	28	21	15	18	72	105	79	76	58	34	26	35
70	27	35	26	18	23	98	126	100	96	68	40	29	43
60	48	49	38	26	32	150	163	138	128	87	52	38	62
50	61	70	54	36	44	205	214	178	178	115	62	49	87
40	78	107	68	53	76	272	288	220	247	154	78	64	121
30	102	147	98	80	100	382	382	304	326	206	100	84	173
25	132	166	120	98	120	444	446	357	388	240	114	100	212
20	172	190	140	115	160	540	519	421	474	289	130	117	266
15	238	219	158	130	229	699	620	504	586	370	169	144	346
10	311	272	190	160	350	961	839	654	800	537	247	226	475
5	418	399	270	222	590	1,920	1,300	1,080	1,310	948	508	429	767

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 51 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	167
0.95	1.05	475
0.90	1.11	790
0.80	1.25	1,400
0.50	2	3,700
0.20	5	8,330
0.10	10	12,000
0.04	25	17,000
0.02	50	20,800
0.01	100	24,600
0.005	200	28,400

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	120	99	75	57
0.95	1.05	331	249	178	132
0.90	1.11	537	389	271	200
0.80	1.25	918	639	434	315
0.50	2	2,210	1,460	956	677
0.20	5	4,430	2,840	1,840	1,270
0.10	10	5,970	3,800	2,450	1,670
0.04	25	7,840	4,990	3,230	2,160
0.02	50	9,120	5,820	3,780	2,500
0.01	100	10,300	6,590	4,300	2,820
0.005	200	11,400	7,320	4,800	3,120

05463000 BEAVER CREEK AT NEW HARTFORD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.2	1.2	1.3	1.5	1.8	2.5	3.1	3.8	4.6
0.02	50	1.7	1.8	1.9	2.1	2.5	3.4	4.2	5.2	6.3
0.05	20	2.8	2.9	3.1	3.4	4.0	5.3	6.6	8.1	10
0.10	10	4.4	4.5	4.8	5.2	6.0	7.8	9.9	12	15
0.20	5	7.3	7.5	7.9	8.5	9.8	12	16	19	24
0.50	2	18	19	20	21	24	30	38	46	58
0.80	1.25	42	43	45	48	54	69	87	107	134
0.90	1.11	62	64	68	73	82	105	134	164	204
0.96	1.04	92	95	102	110	125	164	208	257	313
0.98	1.02	118	122	132	144	163	218	276	343	411
0.99	1.01	145	151	165	181	205	280	354	442	521

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.4	1.5	1.6	2.0	5.1	6.5	7.2	10
0.02	50	2.0	2.1	2.2	2.8	7.3	9.0	10	13
0.05	20	3.4	3.6	3.7	4.6	12	15	16	21
0.10	10	5.3	5.6	5.9	7.0	19	22	24	31
0.20	5	8.9	9.5	10	12	31	35	39	49
0.50	2	23	25	26	32	73	82	94	118
0.80	1.25	56	62	66	83	158	178	209	273
0.90	1.11	88	96	104	136	227	259	310	418
0.96	1.04	137	153	167	231	326	377	464	655
0.98	1.02	181	204	224	324	406	476	595	871
0.99	1.01	231	263	291	439	490	581	740	1,120
		July-August-September				October-November-December			
0.01	100	2.1	2.7	3.0	3.6	1.8	2.2	2.4	3.3
0.02	50	2.9	3.7	4.1	4.8	2.6	3.1	3.4	4.6
0.05	20	4.9	5.8	6.4	7.5	4.4	5.2	5.7	7.4
0.10	10	7.5	8.6	9.3	11	6.9	8.0	8.8	11
0.20	5	12	14	15	17	12	13	15	18
0.50	2	30	32	34	42	28	32	35	42
0.80	1.25	64	70	77	97	62	72	79	93
0.90	1.11	92	103	116	150	90	106	116	138
0.96	1.04	133	155	178	236	130	156	171	206
0.98	1.02	166	200	233	316	163	198	217	264
0.99	1.01	200	250	297	410	197	242	266	329

05463500 BLACK HAWK CREEK AT HUDSON, IOWA

LOCATION.—Lat 42°24'28", long 92°27'47", in SW1/4 NE1/4 sec. 27, T88N, R14W, Black Hawk County, Hydrologic Unit 07080205, on left bank 35 ft downstream from bridge on State Highway 58, 0.2 mi northwest of Chicago and Great Western Railway tracks at the west edge of Hudson, 4.5 mi upstream from Prescotts Creek and 9.6 mi upstream from mouth.

DRAINAGE AREA.—303 mi^2.

PERIOD OF RECORD.—April 1952 to September 1995 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 865.03 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 19,300 ft^3/s, July 9, 1969, gage height, 18.23 ft; minimum daily discharge, 0.12 ft^3/s, January 26, 1977.

Selected values from rating table number 10, developed December 1993
(A discharge measurement to validate this rating has not been made since September 1995)

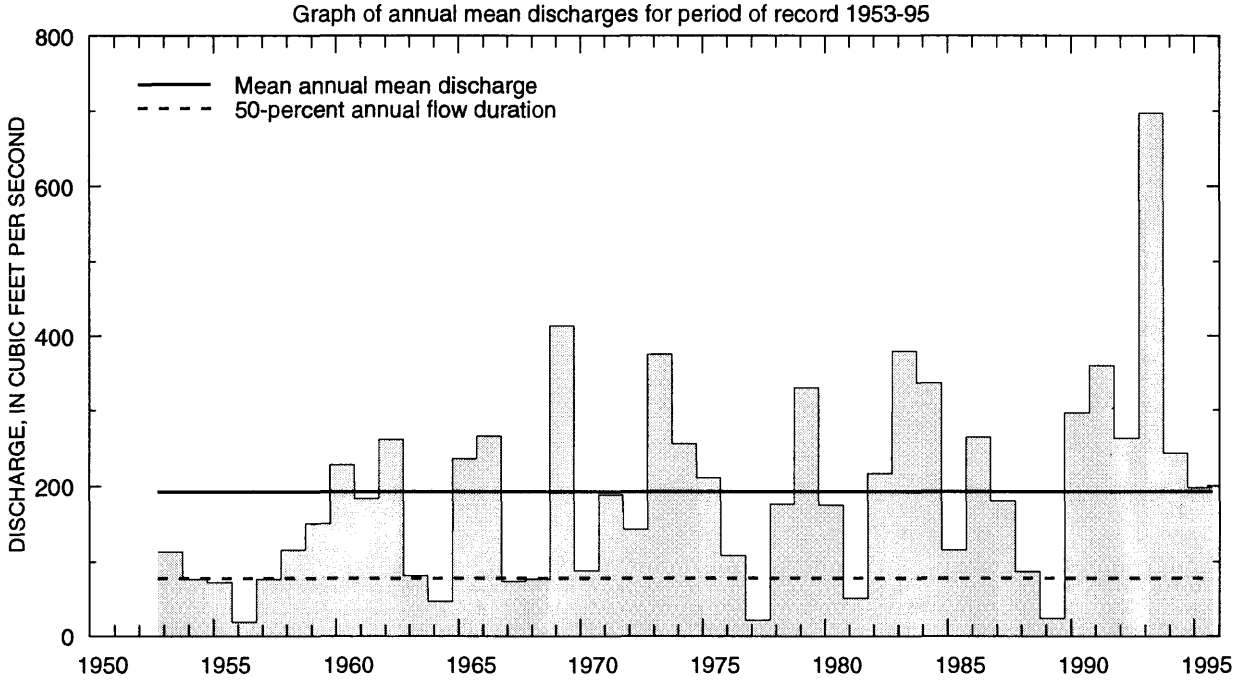
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	47.4	8.0	469
5.5	91.6	10.0	921
6.0	146	12.0	1,490
6.5	210	14.0	2,370
7.0	289	16.0	6,220
7.5	375	18.0	20,000

05463500 BLACK HAWK CREEK AT HUDSON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-95

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	440	1966	5.37	1990	99.1	106
November	359	1973	7.45	1956	111	105
December	418	1983	3.78	1990	88.5	91.1
January	463	1973	2.34	1956	71.8	81.9
February	564	1984	3.07	1956	145	154
March	1,280	1993	15.9	1954	384	313
April	1,173	1991	20.5	1956	324	299
May	1,036	1991	22.9	1977	278	237
June	1,403	1990	10.2	1956	330	311
July	1,705	1993	5.33	1989	259	366
August	1,134	1993	2.38	1989	126	192
September	735	1965	7.18	1989	90.5	142
Annual	697	1993	18.4	1956	192	133

Graph of annual mean discharges for period of record 1953-95



05463500 BLACK HAWK CREEK AT HUDSON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	3.3	7.2	2.4	1.9	2.5	15	14	13	8.1	3.2	2.0	2.8	3.0
95	8.8	9.9	6.3	3.4	6.0	21	23	24	16	12	8.1	8.7	9.0
90	13	14	9.0	6.0	12	30	31	34	28	23	14	13	15
85	15	16	12	8.4	14	40	51	45	39	29	20	17	19
80	17	19	16	11	16	51	71	60	51	36	24	20	25
75	20	25	20	15	19	60	92	72	67	44	29	22	31
70	24	30	24	18	23	77	109	87	86	52	32	26	37
60	38	46	36	28	34	122	140	126	126	75	39	32	54
50	49	72	48	40	56	172	183	172	180	107	50	40	78
40	65	95	70	62	70	234	245	221	248	145	66	51	110
30	96	125	109	84	93	326	336	311	345	197	90	62	160
25	116	144	125	90	116	392	389	360	394	234	104	72	196
20	146	173	145	100	150	475	440	410	467	294	124	86	248
15	185	210	166	115	200	600	528	488	558	378	167	120	327
10	250	255	202	150	334	887	675	624	679	525	258	173	440
5	365	365	280	230	651	1,650	985	848	1,050	970	484	417	699

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 44 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	202
0.95	1.05	475
0.90	1.11	730
0.80	1.25	1,200
0.50	2	2,880
0.20	5	6,310
0.10	10	9,180
0.04	25	13,400
0.02	50	16,800
0.01	100	20,400
0.005	200	24,200

Magnitude and frequency of annual high discharges, based on period of record 1953-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	128	96	75	47
0.95	1.05	314	228	169	114
0.90	1.11	484	345	251	174
0.80	1.25	786	550	391	278
0.50	2	1,760	1,200	817	591
0.20	5	3,420	2,290	1,500	1,060
0.10	10	4,570	3,040	1,950	1,360
0.04	25	6,000	3,980	2,510	1,690
0.02	50	7,000	4,640	2,900	1,900
0.01	100	7,950	5,270	3,260	2,090
0.005	200	8,840	5,870	3,600	2,260

05463500 BLACK HAWK CREEK AT HUDSON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1952 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.22	0.27	0.42	0.79	1.3	2.0	2.7	3.0	3.6
0.02	50	0.46	0.54	0.76	1.3	1.9	2.8	3.8	4.2	5.1
0.05	20	1.2	1.4	1.7	2.4	3.3	4.7	6.2	7.1	8.7
0.10	10	2.7	2.8	3.3	4.1	5.2	7.3	9.4	11	14
0.20	5	5.9	6.1	6.5	7.3	8.8	12	15	18	23
0.50	2	18	18	18	19	21	28	36	43	56
0.80	1.25	35	36	38	40	45	60	77	94	126
0.90	1.11	43	45	49	55	63	85	112	136	185
0.96	1.04	50	53	61	74	87	120	162	197	272
0.98	1.02	52	57	68	86	106	148	203	246	345
0.99	1.01	54	60	74	98	123	176	247	298	422

Magnitude and frequency of seasonal low discharges, based on period of record April 1952 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.23	0.44	0.81	1.5	4.6	5.6	6.1	7.8
0.02	50	0.49	0.80	1.3	2.3	6.3	7.7	8.4	11
0.05	20	1.4	1.8	2.6	4.1	10	12	14	18
0.10	10	3.1	3.6	4.5	6.8	15	18	21	27
0.20	5	7.2	7.7	8.6	12	25	30	33	44
0.50	2	24	25	26	33	60	71	82	109
0.80	1.25	61	64	66	80	137	164	188	257
0.90	1.11	82	94	101	122	208	248	286	394
0.96	1.04	104	131	151	185	319	380	439	614
0.98	1.02	116	158	193	239	417	497	574	810
0.99	1.01	125	183	236	298	528	630	728	1,040
		July-August-September				October-November-December			
0.01	100	1.7	2.2	2.5	3.3	1.2	1.6	1.9	2.9
0.02	50	2.4	2.9	3.4	4.3	1.9	2.4	2.7	4.0
0.05	20	3.9	4.6	5.2	6.4	3.4	4.1	4.7	6.6
0.10	10	6.0	6.7	7.6	9.3	5.6	6.6	7.5	10
0.20	5	9.7	11	12	14	9.8	11	13	16
0.50	2	23	25	27	33	25	28	32	39
0.80	1.25	51	55	59	75	57	63	70	85
0.90	1.11	74	81	89	115	82	92	102	124
0.96	1.04	107	122	134	180	117	132	148	181
0.98	1.02	135	158	175	241	143	165	184	229
0.99	1.01	164	198	221	314	170	199	222	280

05464000 CEDAR RIVER AT WATERLOO, IOWA

LOCATION.—Lat 42°29'44", long 92°20'03", in NW1/4 NW1/4 sec. 25, T89N, R13W, Black Hawk County, Hydrologic Unit 07080205, on left bank at foot of East Seventh Street, 0.3 mi upstream from Eleventh Avenue bridge in Waterloo, 1.1 mi downstream from Black Hawk Creek, and at mile 187.9 upstream from mouth of Iowa River.

DRAINAGE AREA.—5,146 mi^2.

PERIOD OF RECORD.—October 1940 to September 1996. Prior to April 1941, monthly discharge only, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 824.14 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 76,700 ft^3/s, March 29, 1961, gage height, 21.86 ft; minimum daily discharge, 152 ft^3/s, January 28, 1959.

Selected values from rating table number 6, developed October 1987

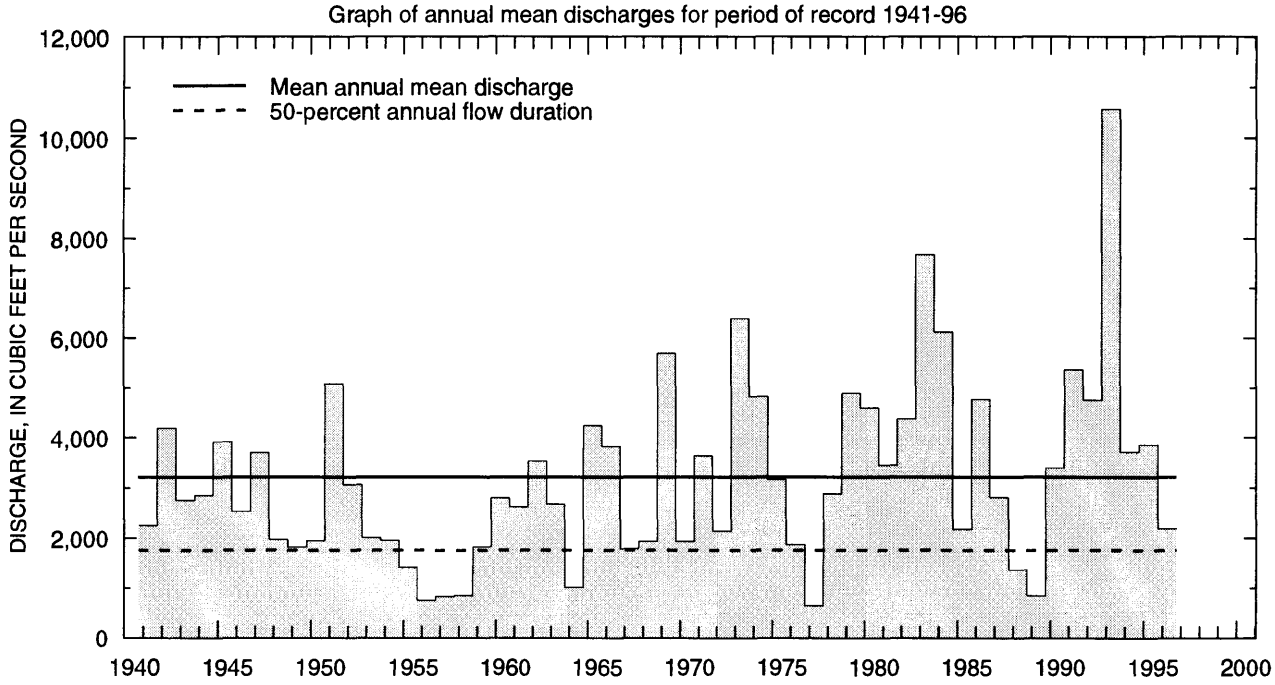
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.7	320	10.0	15,300
5.0	558	12.0	22,200
5.5	1,290	14.0	29,500
6.0	2,380	16.0	37,200
7.0	5,340	18.0	47,000
8.0	8,560	19.5	56,200
9.0	12,000		

05464000 CEDAR RIVER AT WATERLOO, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	8,499	1987	364	1990	2,139	1,965
November	7,434	1973	370	1990	2,062	1,739
December	6,891	1983	266	1990	1,553	1,335
January	5,479	1973	252	1959	1,234	1,032
February	9,448	1984	188	1959	1,740	1,661
March	13,760	1973	687	1964	5,624	3,433
April	24,940	1993	741	1957	6,167	5,286
May	19,010	1991	732	1977	4,483	3,525
June	18,320	1993	474	1977	5,018	3,703
July	21,210	1993	455	1989	3,783	3,842
August	18,770	1993	328	1989	2,680	3,276
September	9,258	1993	387	1955	2,083	1,882
Annual	10,580	1993	636	1977	3,219	1,855

Graph of annual mean discharges for period of record 1941-96



05464000 CEDAR RIVER AT WATERLOO, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	340	330	232	230	190	411	684	562	460	401	317	355	285
95	403	408	320	285	306	656	905	891	735	580	488	442	428
90	495	500	410	350	380	801	1,260	1,150	981	811	579	526	542
85	578	580	466	425	470	902	1,700	1,380	1,270	924	674	604	658
80	678	661	545	490	551	1,110	2,000	1,630	1,540	1,070	766	701	765
75	740	768	618	535	600	1,470	2,360	1,930	1,810	1,220	850	801	880
70	793	870	705	597	658	1,810	2,610	2,170	2,030	1,390	955	892	1,010
60	1,010	1,150	960	737	765	2,570	3,260	2,560	2,580	1,900	1,170	1,070	1,310
50	1,290	1,500	1,150	880	880	3,410	4,060	3,040	3,350	2,400	1,410	1,230	1,760
40	1,630	1,850	1,340	1,030	1,130	4,480	5,090	3,780	4,230	3,020	1,740	1,490	2,320
30	2,250	2,330	1,670	1,290	1,530	5,900	6,680	4,680	5,460	3,760	2,170	2,010	3,080
25	2,660	2,550	1,930	1,500	1,800	7,080	7,600	5,430	6,360	4,330	2,490	2,300	3,660
20	3,280	2,870	2,280	1,700	2,150	8,670	8,730	6,350	7,240	5,000	3,000	2,660	4,460
15	4,050	3,430	2,550	1,990	2,590	10,600	10,100	7,680	8,480	5,990	3,900	3,260	5,530
10	4,840	4,440	3,100	2,250	3,250	13,300	12,400	9,380	10,500	7,610	5,380	4,260	7,330
5	6,460	6,130	4,570	3,100	5,700	18,300	17,900	13,200	14,600	11,500	10,500	7,070	11,000

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 66 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,610
0.95	1.05	5,340
0.90	1.11	7,610
0.80	1.25	11,400
0.50	2	22,800
0.20	5	41,500
0.10	10	54,700
0.04	25	71,600
0.02	50	84,000
0.01	100	96,100
0.005	200	108,000

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,990	1,710	1,400	1,160
0.95	1.05	4,360	3,650	2,930	2,420
0.90	1.11	6,370	5,260	4,170	3,420
0.80	1.25	9,730	7,900	6,170	5,000
0.50	2	19,800	15,500	11,700	9,250
0.20	5	35,300	26,800	19,700	14,900
0.10	10	45,500	34,000	24,500	18,100
0.04	25	57,800	42,400	30,100	21,600
0.02	50	66,300	48,100	33,700	23,800
0.01	100	74,200	53,300	37,000	25,700
0.005	200	81,500	58,000	39,900	27,300

05464000 CEDAR RIVER AT WATERLOO, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1941 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	145	149	155	165	182	199	206	218	230
0.02	50	171	177	184	195	214	235	246	263	283
0.05	20	218	228	238	251	273	301	321	347	385
0.10	10	269	283	295	311	337	374	406	443	505
0.20	5	344	365	381	400	433	487	539	594	697
0.50	2	543	580	606	634	690	802	921	1,040	1,280
0.80	1.25	837	893	930	976	1,080	1,310	1,560	1,810	2,300
0.90	1.11	1,040	1,110	1,150	1,210	1,360	1,690	2,050	2,410	3,120
0.96	1.04	1,300	1,380	1,430	1,510	1,720	2,210	2,730	3,260	4,280
0.98	1.02	1,500	1,580	1,630	1,730	2,010	2,630	3,290	3,970	5,240
0.99	1.01	1,700	1,780	1,830	1,950	2,290	3,060	3,880	4,730	6,270

Magnitude and frequency of seasonal low discharges, based on period of record October 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	149	162	171	189	303	330	339	414
0.02	50	177	191	201	220	369	404	420	511
0.05	20	228	246	256	277	494	545	576	699
0.10	10	284	308	319	344	639	709	759	921
0.20	5	371	403	416	450	871	972	1,060	1,280
0.50	2	610	671	698	775	1,560	1,750	1,960	2,400
0.80	1.25	988	1,110	1,180	1,390	2,770	3,100	3,550	4,460
0.90	1.11	1,260	1,450	1,570	1,920	3,720	4,150	4,820	6,140
0.96	1.04	1,640	1,920	2,120	2,740	5,090	5,630	6,630	8,600
0.98	1.02	1,930	2,290	2,580	3,480	6,220	6,850	8,130	10,700
0.99	1.01	2,240	2,700	3,090	4,330	7,430	8,140	9,740	13,000
		July-August-September				October-November-December			
0.01	100	255	291	305	332	155	179	186	208
0.02	50	286	323	338	368	184	215	225	250
0.05	20	344	382	398	436	239	282	298	331
0.10	10	409	449	468	515	301	359	383	425
0.20	5	511	556	581	644	397	479	517	575
0.50	2	816	883	932	1,060	674	827	910	1,030
0.80	1.25	1,380	1,510	1,630	1,940	1,140	1,420	1,590	1,830
0.90	1.11	1,860	2,060	2,270	2,770	1,500	1,880	2,120	2,490
0.96	1.04	2,610	2,930	3,310	4,180	2,020	2,530	2,870	3,440
0.98	1.02	3,280	3,730	4,300	5,560	2,430	3,060	3,490	4,250
0.99	1.01	4,060	4,690	5,500	7,280	2,880	3,630	4,150	5,130

05464130 FOURMILE CREEK NEAR LINCOLN, IOWA

LOCATION.—Lat 42°13'32", long 92°36'39", in SW 1/4 SW1/4 sec. 28, T86N, R15W, Tama County, Hydrologic Unit 07080205, on left bank 10 ft downstream from bridge on county highway, 1.0 mi upstream from Half Mile Creek and 4.7 mi southeast of Lincoln.

DRAINAGE AREA.—13.8 mi^2.

PERIOD OF RECORD.—October 1962 to September 1967, October 1969 to September 1974, June 1976 to September 1980 (discontinued).

GAGE.—Water-stage recorder and concrete control with V-notch sharp-crested weir. Datum of gage is 931.26 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 1,450 ft^3/s, June 22, 1974, gage height, 13.98 ft; no flow December 4, 1976–February 23. 1977, July 4–5, 13–14, 1977.

Selected values from rating table number 4, developed October 1978
(A discharge measurement to validate this rating has not been made since October 1980)

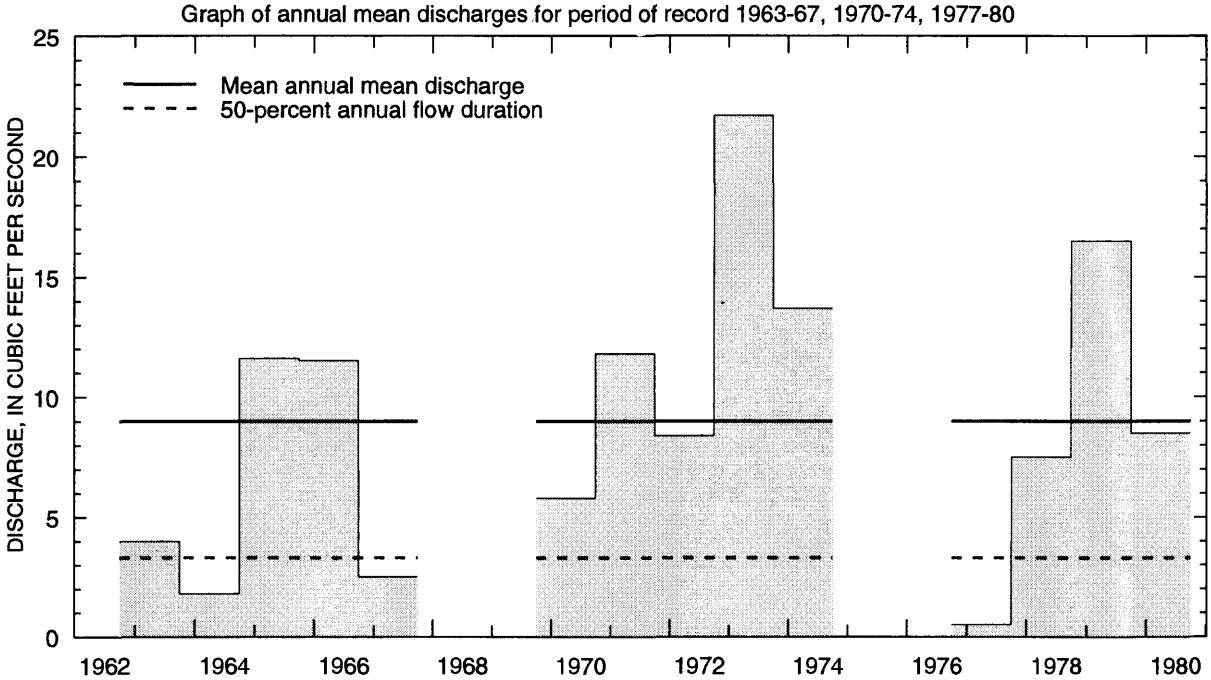
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.0	15	11.0	278
7.5	38	12.0	479
8.0	55	13.0	829
9.0	96	14.0	1,410
10.0	165		

05464130 FOURMILE CREEK NEAR LINCOLN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1963-67, 1970-74, 1977-80

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	17.0	1966	0.086	1977	5.24	5.39
November	16.6	1973	0.067	1977	4.94	5.09
December	20.4	1973	0.001	1977	4.77	5.64
January	17.2	1973	0.000	1977	4.84	5.29
February	28.6	1971	0.007	1977	8.49	8.30
March	69.4	1979	0.49	1977	20.4	18.2
April	63.6	1973	0.37	1977	14.8	17.8
May	38.8	1973	0.049	1977	11.4	10.0
June	45.0	1974	0.035	1977	14.1	12.5
July	30.9	1979	0.064	1977	9.37	8.83
August	23.9	1972	0.64	1964	4.52	6.03
September	28.8	1965	0.31	1971	4.92	7.30
Annual	21.7	1973	0.49	1977	8.99	5.99

Graph of annual mean discharges for period of record 1963-67, 1970-74, 1977-80



05464130 FOURMILE CREEK NEAR LINCOLN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1963-67, 1970-74, 1977-80

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.06	0.04	0.00	0.00	0.00	0.18	0.07	0.01	0.01	0.00	0.04	0.02	0.00
95	0.09	0.08	0.00	0.00	0.00	0.36	0.42	0.03	0.03	0.02	0.23	0.26	0.11
90	0.21	0.52	0.29	0.36	0.33	0.66	2.0	1.2	1.1	0.51	0.43	0.34	0.41
85	0.48	0.59	0.42	0.45	0.51	0.85	2.4	1.9	1.7	0.86	0.55	0.46	0.61
80	0.62	0.64	0.53	0.55	0.62	1.1	2.8	2.6	2.5	1.1	0.63	0.59	0.78
75	0.68	0.72	0.68	0.68	0.72	1.9	3.5	3.0	3.1	1.4	0.78	0.75	1.0
70	0.80	0.81	0.80	0.81	1.0	2.9	3.9	3.3	3.9	1.7	0.90	0.81	1.3
60	1.3	1.8	1.2	1.2	1.3	4.5	4.8	4.1	6.0	2.7	1.2	1.0	2.2
50	2.6	2.6	1.8	1.6	2.0	6.9	5.9	6.4	7.7	3.6	1.9	1.5	3.3
40	3.9	4.2	3.9	2.9	2.4	9.4	8.9	8.8	10	4.8	2.5	1.8	4.8
30	5.3	6.2	5.5	3.8	4.7	14	11	11	13	6.9	3.5	2.5	6.9
25	6.2	7.6	6.0	4.4	5.8	16	12	13	15	7.7	4.1	3.5	8.2
20	7.4	9.3	7.0	5.2	6.6	20	14	16	18	9.3	5.0	5.0	10
15	9.9	11	7.8	6.5	8.8	29	17	19	21	11	5.9	7.0	13
10	13	13	8.9	8.6	15	40	24	24	28	15	7.8	9.9	17
5	18	15	12	14	41	85	43	36	39	24	19	23	29

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 14 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	55
0.95	1.05	109
0.90	1.11	153
0.80	1.25	225
0.50	2	437
0.20	5	771
0.10	10	1,000
0.04	25	1,290
0.02	50	1,500
0.01	100	1,700
0.005	200	1,890

Magnitude and frequency of annual high discharges, based on period of record 1963-67, 1970-74, 1977-80

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	9.7	4.8	3.0	1.9
0.95	1.05	23	12	7.3	4.7
0.90	1.11	35	18	11	7.3
0.80	1.25	55	30	18	12
0.50	2	118	68	42	27
0.20	5	218	135	82	54
0.10	10	285	182	111	73
0.04	25	365	242	147	98
0.02	50	419	284	173	115
0.01	100	470	325	198	132
0.005	200	516	364	221	148

05464130 FOURMILE CREEK NEAR LINCOLN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1963 to March 1967, April 1970 to March 1974, April 1977 to March 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.18
0.02	50	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.05	0.26
0.05	20	0.00	0.00	0.00	0.03	0.04	0.05	0.06	0.12	0.43
0.10	10	0.06	0.06	0.07	0.08	0.09	0.13	0.15	0.25	0.67
0.20	5	0.13	0.15	0.17	0.18	0.22	0.33	0.40	0.54	1.1
0.50	2	0.31	0.37	0.44	0.60	0.84	1.4	1.8	2.0	3.0
0.80	1.25	0.73	0.88	1.0	1.4	2.1	3.6	5.5	5.8	7.4
0.90	1.11	1.2	1.4	1.6	1.8	3.0	5.1	8.7	9.4	12
0.96	1.04	2.0	2.3	2.5	2.7	4.0	6.8	13	15	19
0.98	1.02	2.9	3.2	3.4	3.6	4.5	7.8	16	19	25
0.99	1.01	4.1	4.4	4.5	4.6	5.0	8.6	19	24	33

Magnitude and frequency of seasonal low discharges, based on period of record October 1962 to September 1967, October 1969 to September 1974, July 1976 to September 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04
0.05	20	0.00	0.00	0.00	0.00	0.00	0.07	0.09	0.16
0.10	10	0.09	0.14	0.22	0.37	0.22	0.23	0.29	0.48
0.20	5	0.19	0.34	0.45	0.63	0.78	0.79	0.93	1.4
0.50	2	0.58	1.0	1.2	1.5	2.4	3.8	4.2	5.7
0.80	1.25	1.8	2.6	2.9	4.2	5.7	7.8	8.9	11
0.90	1.11	3.4	4.3	4.5	7.5	9.0	9.1	11	13
0.96	1.04	7.0	7.2	7.4	15	9.8	9.8	12	14
0.98	1.02	10	10	10	23	10	10	12	15
0.99	1.01	12	13	14	37	10	10	12	15
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00
0.02	50	0.00	0.01	0.01	0.03	0.00	0.00	0.00	0.00
0.05	20	0.00	0.02	0.03	0.07	0.00	0.00	0.00	0.00
0.10	10	0.04	0.06	0.07	0.14	0.07	0.09	0.13	0.18
0.20	5	0.13	0.14	0.17	0.29	0.18	0.27	0.36	0.49
0.50	2	0.50	0.60	0.68	0.92	0.74	1.0	1.2	1.7
0.80	1.25	1.3	1.6	1.8	2.3	2.5	3.1	3.6	4.8
0.90	1.11	1.9	2.4	2.7	3.3	4.8	5.5	6.1	8.0
0.96	1.04	2.8	3.2	3.7	4.6	9.5	9.7	10	13
0.98	1.02	3.5	3.7	4.3	5.5	15	15	15	19
0.99	1.01	4.2	4.2	4.9	6.3	20	20	20	25

05464133 HALF MILE CREEK NEAR GLADBROOK, IOWA

LOCATION.—Lat 42°12'40", long 92°36'39", in SW1/4 SW1/4 sec. 33, T86N, R15W, Tama County, Hydrologic Unit 07080205, on right bank 10 ft downstream from bridge on county highway, 0.8 mi upstream from mouth and 5.3 northeast of Goldbrick.

DRAINAGE AREA.—1.33 mi^2.

PERIOD OF RECORD.—October 1962 to September 1967, October 1969 to September 1974, June 1976 to September 1980 (discontinued).

GAGE.—Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 948.16 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 611 ft^3/s, June 12, 1979, gage height, 9.57 ft; no flow many days during period of record.

Selected values from rating table number 3, developed October 1978
(A discharge measurement to validate this rating has not been made since October 1980)

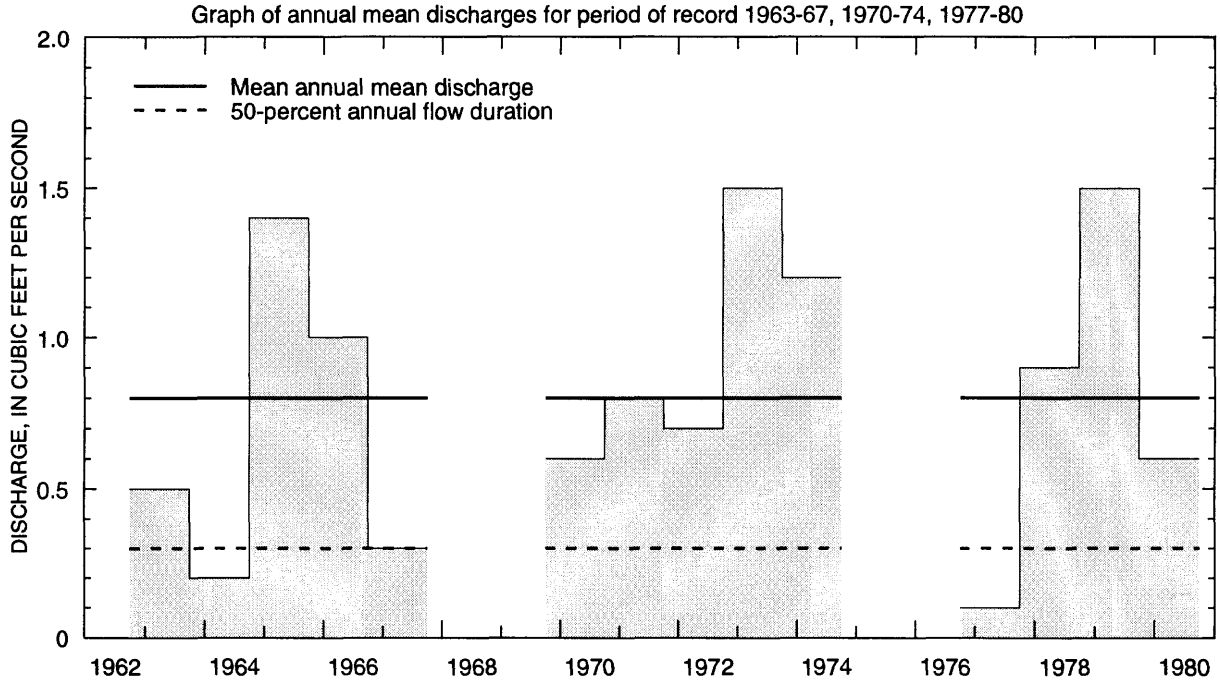
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	1.2	6.5	84
4.5	5.0	7.0	128
5.0	13	8.0	259
5.5	28	9.0	460
6.0	51		

05464133 HALF MILE CREEK NEAR GLADBROOK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1963-67, 1970-74, 1977-80

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1.03	1966	0.001	1977	0.41	0.36
November	1.38	1973	0.002	1977	0.41	0.41
December	1.96	1973	0.000	1977	0.40	0.51
January	1.84	1973	0.000	1977	0.47	0.51
February	2.92	1971	0.002	1977	1.00	1.01
March	4.33	1979	0.069	1977	1.56	1.23
April	6.54	1965	0.035	1977	1.55	1.87
May	1.81	1974	0.009	1977	0.91	0.61
June	4.39	1974	0.003	1977	1.14	1.16
July	2.60	1979	0.025	1977	0.85	0.81
August	3.33	1972	0.054	1971	0.61	0.84
September	1.84	1965	0.015	1971	0.48	0.54
Annual	1.54	1973	0.12	1977	0.82	0.47

Graph of annual mean discharges for period of record 1963-67, 1970-74, 1977-80



05464133 HALF MILE CREEK NEAR GLADBROOK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1963-67, 1970-74, 1977-80

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.01	0.00	0.00	0.01	0.01	0.00
90	0.00	0.03	0.02	0.00	0.02	0.08	0.18	0.13	0.07	0.03	0.02	0.02	0.02
85	0.00	0.07	0.04	0.04	0.03	0.10	0.23	0.16	0.10	0.05	0.02	0.03	0.05
80	0.04	0.08	0.05	0.06	0.07	0.12	0.26	0.19	0.17	0.08	0.03	0.04	0.08
75	0.08	0.08	0.07	0.07	0.09	0.17	0.30	0.22	0.24	0.10	0.04	0.05	0.10
70	0.09	0.10	0.09	0.10	0.10	0.26	0.34	0.27	0.30	0.12	0.06	0.07	0.12
60	0.13	0.21	0.14	0.14	0.12	0.36	0.47	0.39	0.46	0.19	0.11	0.10	0.20
50	0.30	0.27	0.22	0.18	0.20	0.56	0.61	0.53	0.59	0.32	0.14	0.13	0.29
40	0.37	0.35	0.31	0.22	0.25	0.85	0.81	0.77	0.78	0.48	0.20	0.20	0.42
30	0.48	0.50	0.45	0.28	0.33	1.3	1.1	1.1	0.97	0.66	0.32	0.30	0.59
25	0.56	0.56	0.50	0.33	0.51	1.6	1.3	1.2	1.1	0.75	0.41	0.38	0.71
20	0.62	0.60	0.56	0.40	0.68	2.0	1.7	1.5	1.3	0.91	0.56	0.49	0.88
15	0.71	0.78	0.60	0.59	1.0	2.5	2.1	1.7	1.6	1.0	0.84	0.60	1.1
10	0.87	1.1	0.69	0.86	2.1	3.2	2.6	2.0	2.8	1.6	1.3	0.82	1.6
5	1.2	1.3	0.89	1.4	5.4	5.9	5.3	2.6	3.8	3.1	2.3	1.7	2.9

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 14 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	32
0.95	1.05	50
0.90	1.11	64
0.80	1.25	85
0.50	2	147
0.20	5	250
0.10	10	329
0.04	25	439
0.02	50	527
0.01	100	622
0.005	200	722

Magnitude and frequency of annual high discharges, based on period of record 1963-67, 1970-74, 1977-80

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2.5	1.2	0.68	0.42
0.95	1.05	4.0	2.0	1.2	0.78
0.90	1.11	5.0	2.6	1.6	1.1
0.80	1.25	6.6	3.6	2.3	1.5
0.50	2	11	6.4	4.2	2.8
0.20	5	17	11	7.5	4.8
0.10	10	22	15	9.9	6.2
0.04	25	27	20	13	7.8
0.02	50	32	24	16	9.1
0.01	100	36	28	19	10
0.005	200	40	33	22	11

05464133 HALF MILE CREEK NEAR GLADBROOK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1963 to March 1967, April 1970 to March 1974, April 1977 to March 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.09
0.20	5	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.06	0.14
0.50	2	0.02	0.02	0.03	0.03	0.05	0.12	0.15	0.18	0.32
0.80	1.25	0.05	0.06	0.07	0.08	0.14	0.28	0.40	0.47	0.67
0.90	1.11	0.07	0.09	0.11	0.12	0.23	0.42	0.62	0.72	0.96
0.96	1.04	0.11	0.14	0.17	0.20	0.39	0.60	0.94	1.1	1.4
0.98	1.02	0.15	0.19	0.22	0.27	0.56	0.75	1.2	1.4	1.7
0.99	1.01	0.19	0.26	0.29	0.36	0.79	0.91	1.5	1.7	2.1

Magnitude and frequency of seasonal low discharges, based on period of record October 1962 to September 1967, October 1969 to September 1974, July 1976 to September 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.03	0.04	0.05	0.05	0.08
0.20	5	0.02	0.03	0.03	0.06	0.07	0.09	0.10	0.16
0.50	2	0.08	0.10	0.11	0.15	0.18	0.22	0.26	0.39
0.80	1.25	0.20	0.23	0.27	0.36	0.41	0.48	0.59	0.85
0.90	1.11	0.31	0.35	0.39	0.57	0.63	0.72	0.90	1.3
0.96	1.04	0.48	0.51	0.56	0.94	0.96	1.1	1.4	1.9
0.98	1.02	0.63	0.64	0.70	1.3	1.3	1.5	1.9	2.4
0.99	1.01	0.81	0.82	0.85	1.8	1.6	1.9	2.5	3.0
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.04
0.50	2	0.02	0.03	0.04	0.07	0.09	0.10	0.12	0.18
0.80	1.25	0.06	0.10	0.11	0.18	0.23	0.27	0.32	0.44
0.90	1.11	0.11	0.17	0.19	0.29	0.35	0.41	0.50	0.65
0.96	1.04	0.21	0.29	0.33	0.49	0.51	0.57	0.74	0.92
0.98	1.02	0.31	0.41	0.47	0.68	0.65	0.69	0.94	1.1
0.99	1.01	0.48	0.57	0.65	0.92	0.82	0.83	1.2	1.4

05464137 FOURMILE CREEK NEAR TRAER, IOWA

LOCATION.—Lat 42°12'07", long 92°33'44", near center of sec. 2, T85N, R15W, Tama County, Hydrologic Unit 07080205, on left bank 10 ft downstream from bridge on county highway, 2.0 mi upstream from mouth and 5.0 mi northwest of Traer.

DRAINAGE AREA.—19.5 mi^2.

PERIOD OF RECORD.—October 1962 to September 1974, October 1975 to January 1981 (discontinued).

GAGE.—Water stage recorder and V-notch sharp-crested weir. Datum of gage is 905.87 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 1,450 ft^3/s, March 18, 1979, gage height 11.93 ft; maximum gage height, 13.41 ft, February 19, 1971, backwater from ice; no flow many days in 1976 and 1977.

Selected values from rating table number 7
developed October 1978
(A discharge measurement to validate this rating
has not been made since January 1981)

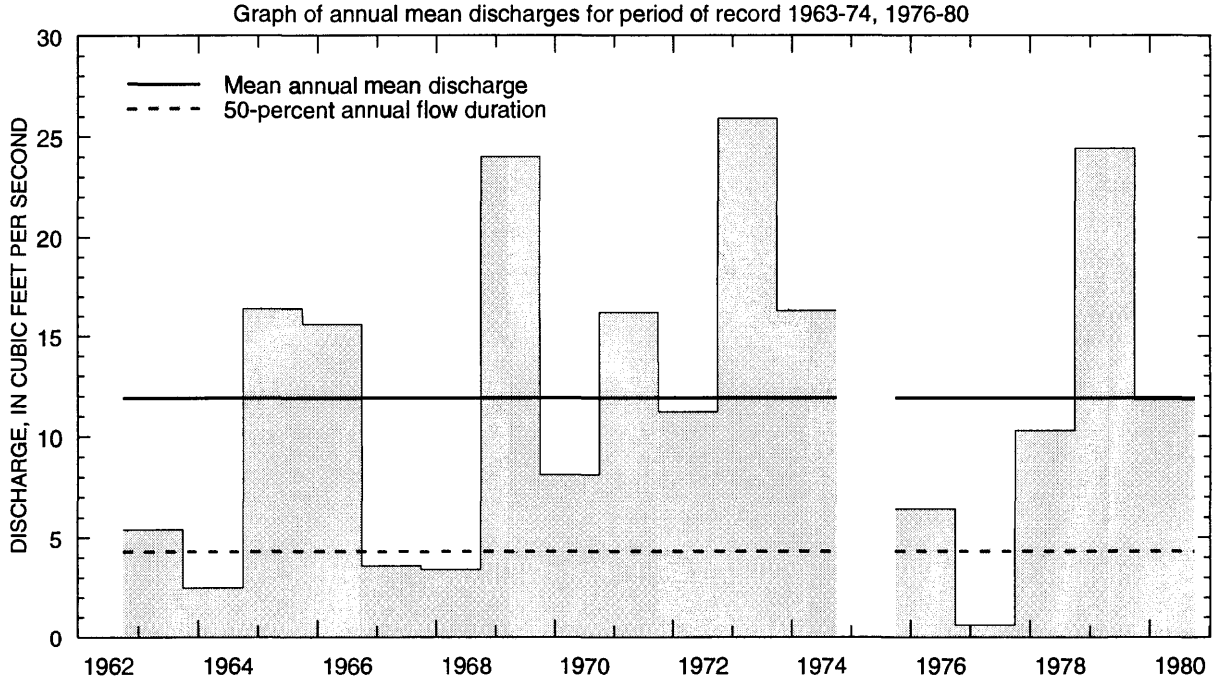
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.0	4.7	9.0	300
7.5	20	10.0	611
8.0	64	11.0	947
8.5	161	12.0	1,500

05464137 FOURMILE CREEK NEAR TRAER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1963-74, 1976-80

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	22.3	1966	0.19	1977	6.34	6.62
November	20.9	1973	0.21	1977	6.10	6.38
December	22.4	1973	0.002	1977	5.81	6.07
January	22.4	1973	0.000	1977	6.28	6.48
February	40.8	1971	0.008	1977	10.6	10.5
March	103	1979	0.92	1977	27.7	26.2
April	80.9	1973	0.77	1977	20.8	21.6
May	41.0	1973	0.16	1977	15.0	10.8
June	48.2	1974	0.031	1977	18.3	15.3
July	63.8	1969	0.25	1977	13.9	16.5
August	27.2	1972	0.43	1976	6.45	6.81
September	36.2	1965	0.20	1976	5.55	8.39
Annual	25.9	1973	0.64	1977	11.9	7.98

Graph of annual mean discharges for period of record 1963-74, 1976-80



05464137 FOURMILE CREEK NEAR TRAER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1963-74, 1976-80

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.10	0.00	0.00	0.00	0.40	0.22	0.05	0.00	0.00	0.11	0.13	0.00
95	0.24	0.30	0.00	0.00	0.01	0.69	1.3	0.26	0.05	0.16	0.30	0.24	0.29
90	0.41	0.90	0.49	0.40	0.58	1.1	2.8	2.0	1.6	1.0	0.47	0.38	0.65
85	0.90	1.0	0.60	0.60	0.80	1.4	3.3	2.6	2.1	1.2	0.69	0.60	0.94
80	1.0	1.0	0.82	0.70	0.97	1.7	4.0	3.6	2.8	1.6	0.82	0.87	1.2
75	1.1	1.1	1.0	0.90	1.1	2.4	4.8	4.1	3.9	1.9	1.0	1.1	1.4
70	1.2	1.3	1.2	1.0	1.3	3.6	5.6	4.7	5.0	2.4	1.2	1.2	1.8
60	1.5	2.4	1.8	1.5	1.8	6.2	7.1	6.4	6.9	3.4	1.7	1.5	2.9
50	3.1	3.2	2.3	2.1	2.4	9.0	9.1	10	9.7	4.7	2.4	2.0	4.3
40	4.3	4.5	3.9	4.2	3.7	13	13	13	13	6.8	3.8	2.7	6.3
30	6.5	7.0	6.6	5.1	5.0	19	16	17	17	9.4	5.8	3.6	9.1
25	7.5	8.8	7.9	5.6	6.9	22	19	20	20	11	7.2	4.5	11
20	9.2	10	8.6	6.6	8.3	26	22	23	25	13	8.1	6.3	14
15	12	13	9.8	8.7	11	35	28	27	30	19	10	7.9	18
10	15	17	12	11	20	55	37	32	37	24	14	11	24
5	23	20	16	20	55	120	64	43	52	41	24	26	39

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 17 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	115
0.95	1.05	184
0.90	1.11	234
0.80	1.25	310
0.50	2	516
0.20	5	829
0.10	10	1,050
0.04	25	1,330
0.02	50	1,540
0.01	100	1,760
0.005	200	1,970

Magnitude and frequency of annual high discharges, based on period of record 1963-74, 1976-80

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	9.6	5.6	3.1	2.1
0.95	1.05	23	14	8.4	5.6
0.90	1.11	35	22	13	8.9
0.80	1.25	57	36	23	15
0.50	2	133	84	54	35
0.20	5	277	173	108	70
0.10	10	389	239	146	95
0.04	25	541	327	193	125
0.02	50	659	392	225	146
0.01	100	778	456	255	166
0.005	200	899	519	283	184

05464137 FOURMILE CREEK NEAR TRAER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1963 to March 1974, April 1976 to March 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.25
0.10	10	0.00	0.00	0.00	0.00	0.05	0.08	0.13	0.26	0.51
0.20	5	0.16	0.19	0.22	0.22	0.23	0.36	0.49	0.63	1.1
0.50	2	0.47	0.57	0.65	0.75	1.1	1.7	2.3	2.5	3.7
0.80	1.25	1.1	1.3	1.5	1.7	2.8	4.3	6.2	6.9	9.0
0.90	1.11	1.8	2.0	2.4	2.6	3.9	6.0	9.3	10	13
0.96	1.04	3.0	3.2	3.7	4.0	5.0	7.7	13	15	17
0.98	1.02	4.2	4.3	5.0	5.4	5.6	8.7	16	18	20
0.99	1.01	5.7	5.8	6.7	7.2	7.4	9.6	19	20	22

Magnitude and frequency of seasonal low discharges, based on period of record October 1962 to September 1974, October 1975 to December 1980

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22
0.10	10	0.14	0.21	0.30	0.59	0.80	1.0	1.2	1.2
0.20	5	0.29	0.44	0.55	0.89	1.4	1.7	2.0	2.1
0.50	2	0.89	1.3	1.4	2.0	3.2	3.9	4.4	8.6
0.80	1.25	2.5	3.3	3.5	4.9	7.3	8.4	9.8	16
0.90	1.11	4.4	5.3	5.6	8.4	11	13	15	18
0.96	1.04	8.1	8.6	9.1	16	18	20	24	24
0.98	1.02	12	12	13	24	25	27	32	32
0.99	1.01	16	16	17	37	34	36	43	44
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.02	0.11	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.04	0.15	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.09	0.25	0.00	0.00	0.00	0.00
0.10	10	0.08	0.18	0.18	0.39	0.15	0.23	0.31	0.40
0.20	5	0.23	0.35	0.37	0.63	0.32	0.45	0.58	0.76
0.50	2	0.82	0.93	1.2	1.5	1.0	1.3	1.6	2.1
0.80	1.25	2.0	2.2	2.7	3.3	3.0	3.6	4.1	5.3
0.90	1.11	3.0	3.3	3.9	4.8	5.4	6.2	6.8	8.8
0.96	1.04	4.2	5.0	5.2	6.9	9.7	11	12	15
0.98	1.02	5.1	6.6	6.8	8.6	14	16	17	21
0.99	1.01	6.0	8.4	9.0	11	20	22	24	29

05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA

LOCATION.—Lat 41°58'14", long 91°40'01", in SE1/4 NW1/4 sec. 28, T83N, R7W, Linn County, Hydrologic Unit 07080205, on right bank 400 ft upstream from bridge on Eighth Avenue in Cedar Rapids, 2.7 mi upstream from Prairie Creek, and at mile 112.7 upstream from mouth of Iowa River.

DRAINAGE AREA.—6,510 mi^2.

PERIOD OF RECORD.—October 1902 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 700.47 ft above sea level. Prior to August 20, 1920, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 73,000 ft^3/s, March 31, 1961, gage height, 19.66 ft; maximum gage height, 20.0 ft, March 18, 1929; minimum daily discharge, 140 ft^3/s, November 18, 1989.

REMARKS.—Flow affected by hydroelectric dam 1/2 mi upstream since June 1979.

Selected values from rating table number 21, developed February 1997

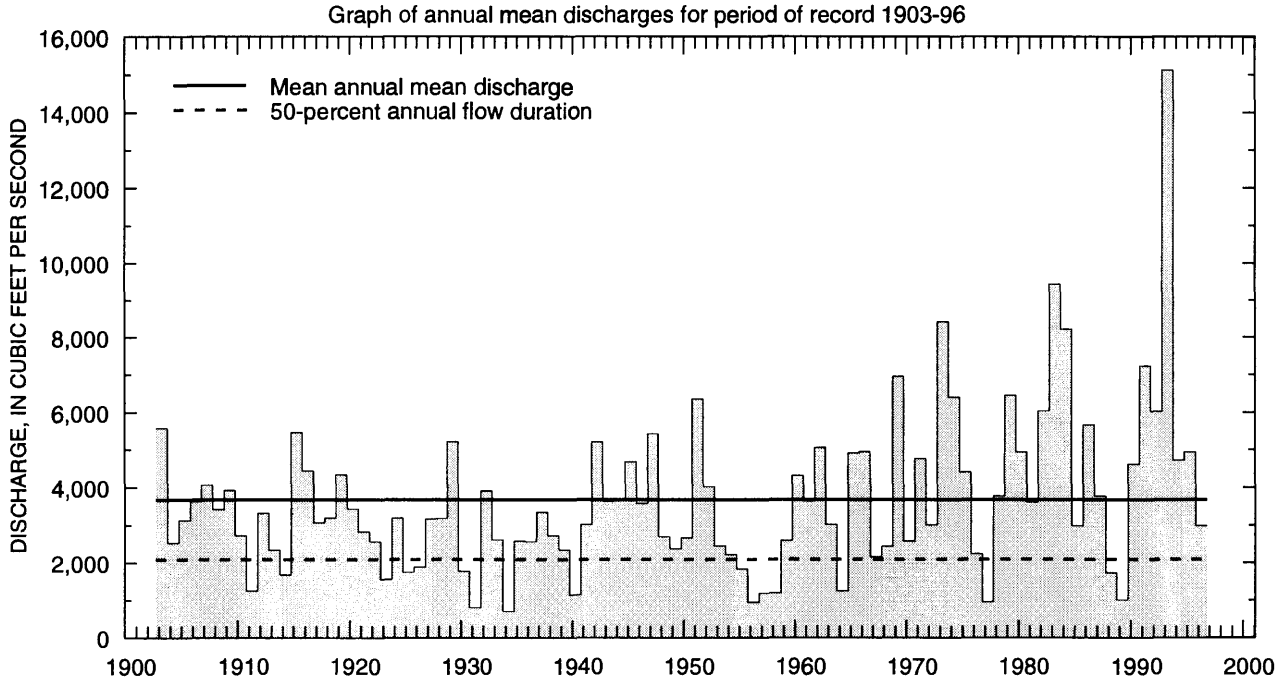
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.1	625	7.0	11,000
3.5	1,320	9.0	16,900
4.0	2,390	12.0	29,500
5.0	5,200	15.0	45,300
6.0	8,370	20.0	76,000

05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1903-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	10,570	1987	463	1990	2,342	1,975
November	9,327	1973	410	1990	2,403	1,935
December	8,675	1983	290	1990	1,852	1,595
January	8,529	1973	299	1911	1,571	1,418
February	12,230	1984	304	1940	2,447	2,002
March	17,420	1929	664	1934	6,703	3,993
April	35,320	1993	1,045	1957	6,731	5,714
May	24,500	1991	527	1934	5,091	3,993
June	23,420	1947	350	1934	5,563	4,406
July	33,910	1993	533	1989	4,021	4,635
August	28,700	1993	377	1934	2,948	3,807
September	13,990	1993	466	1934	2,407	2,090
Annual	15,130	1993	689	1934	3,676	2,140

Graph of annual mean discharges for period of record 1903-96



05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA—Continued

Monthly and annual flow durations, based on period of record 1903-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	450	400	300	280	286	565	908	647	417	467	381	426	340
95	549	540	400	340	400	828	1,200	1,050	747	590	538	573	520
90	627	644	490	428	500	1,070	1,500	1,340	1,100	812	690	689	664
85	734	725	554	500	600	1,440	1,970	1,610	1,360	1,020	810	772	804
80	828	830	640	580	680	1,750	2,320	1,880	1,630	1,250	940	849	940
75	905	950	730	660	800	2,280	2,600	2,110	2,030	1,440	1,040	950	1,080
70	978	1,100	840	710	860	2,810	2,980	2,430	2,360	1,610	1,130	1,060	1,230
60	1,240	1,370	1,020	880	1,040	3,620	3,640	3,040	2,960	2,020	1,370	1,270	1,610
50	1,580	1,630	1,270	1,050	1,340	4,430	4,360	3,620	3,790	2,550	1,620	1,520	2,090
40	1,970	2,040	1,610	1,250	1,870	5,620	5,480	4,360	4,700	3,230	2,010	1,880	2,770
30	2,550	2,630	2,000	1,600	2,450	7,450	7,130	5,400	6,110	4,060	2,510	2,370	3,680
25	2,970	2,990	2,250	1,800	2,800	8,600	8,120	6,120	7,050	4,610	2,840	2,700	4,290
20	3,500	3,550	2,610	2,050	3,400	10,000	9,550	7,170	8,080	5,460	3,430	3,090	5,050
15	4,270	4,110	3,240	2,500	4,010	11,900	11,100	8,340	9,480	6,410	4,280	3,730	6,220
10	4,950	4,910	3,850	3,020	5,220	14,900	13,500	10,300	11,800	8,040	5,630	4,860	8,160
5	6,740	7,100	5,060	4,590	7,970	20,700	18,700	14,500	16,700	10,800	8,940	7,140	11,900

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 94 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	3,930
0.95	1.05	7,120
0.90	1.11	9,580
0.80	1.25	13,400
0.50	2	24,200
0.20	5	40,400
0.10	10	51,400
0.04	25	65,000
0.02	50	74,900
0.01	100	84,400
0.005	200	93,700

Magnitude and frequency of annual high discharges, based on period of record 1903-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	3,150	2,710	2,070	1,560
0.95	1.05	5,920	5,030	3,870	2,960
0.90	1.11	8,070	6,820	5,240	4,040
0.80	1.25	11,500	9,610	7,380	5,700
0.50	2	21,100	17,200	13,100	10,100
0.20	5	35,400	28,200	21,200	16,100
0.10	10	45,000	35,300	26,200	19,800
0.04	25	56,700	43,700	32,100	24,000
0.02	50	65,100	49,500	36,000	26,700
0.01	100	73,000	54,900	39,700	29,200
0.005	200	80,700	60,100	43,100	31,500

05464500 CEDAR RIVER AT CEDAR RAPIDS, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1903 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	179	201	202	214	228	250	273	293	325
0.02	50	205	228	233	246	264	291	321	347	390
0.05	20	252	277	289	304	328	366	408	447	511
0.10	10	303	330	349	368	400	449	506	560	650
0.20	5	380	409	440	465	508	578	658	736	870
0.50	2	590	626	687	730	808	941	1,090	1,240	1,510
0.80	1.25	923	975	1,070	1,160	1,300	1,550	1,830	2,100	2,620
0.90	1.11	1,170	1,240	1,360	1,470	1,660	2,020	2,400	2,760	3,500
0.96	1.04	1,510	1,600	1,750	1,910	2,180	2,680	3,220	3,700	4,740
0.98	1.02	1,780	1,900	2,060	2,270	2,590	3,230	3,890	4,480	5,770
0.99	1.01	2,070	2,220	2,380	2,650	3,040	3,820	4,620	5,310	6,880

Magnitude and frequency of seasonal low discharges, based on period of record October 1902 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	208	215	224	239	343	392	411	470
0.02	50	238	247	258	278	419	477	502	580
0.05	20	293	307	321	350	563	638	678	792
0.10	10	354	375	393	433	729	823	882	1,040
0.20	5	449	481	506	567	993	1,120	1,210	1,450
0.50	2	723	792	845	984	1,770	1,980	2,190	2,690
0.80	1.25	1,200	1,350	1,460	1,790	3,110	3,470	3,920	4,910
0.90	1.11	1,580	1,800	1,980	2,490	4,150	4,620	5,290	6,700
0.96	1.04	2,140	2,480	2,770	3,590	5,610	6,240	7,260	9,280
0.98	1.02	2,620	3,060	3,460	4,590	6,790	7,560	8,880	11,400
0.99	1.01	3,150	3,710	4,240	5,760	8,060	8,970	10,600	13,800
		July-August-September				October-November-December			
0.01	100	301	337	345	387	182	239	253	281
0.02	50	334	372	383	429	214	278	295	329
0.05	20	396	437	455	507	271	349	374	418
0.10	10	467	512	536	598	336	429	462	520
0.20	5	579	631	668	746	436	552	599	680
0.50	2	923	1,000	1,080	1,220	720	903	1,000	1,150
0.80	1.25	1,580	1,720	1,880	2,210	1,200	1,500	1,690	2,000
0.90	1.11	2,170	2,370	2,600	3,150	1,560	1,960	2,250	2,700
0.96	1.04	3,100	3,420	3,770	4,730	2,080	2,630	3,060	3,730
0.98	1.02	3,970	4,400	4,870	6,270	2,510	3,190	3,740	4,610
0.99	1.01	4,990	5,570	6,190	8,170	2,970	3,790	4,480	5,600

05464640 PRAIRIE CREEK AT FAIRFAX, IOWA

LOCATION.—Lat 41°55'22", long 91°47'02", in SW1/4 SE1/4 sec. 9, T82N, R8W, Linn County, Hydrologic Unit 07080205, on right bank 12 ft upstream from bridge on State Highway 149 at west side of Fairfax and 10.7 mi upstream from mouth.

DRAINAGE AREA.—178 mi^2.

PERIOD OF RECORD.—October 1966 to September 1982 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 737.00 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,140 ft^3/s, March 19, 1979, gage height, 14.63 ft; no flow July 10-15, 30, August 1, 3, 1977.

Selected values from rating table number 10
developed October 1980
(A discharge measurement to validate this rating
has not been made since October 1982)

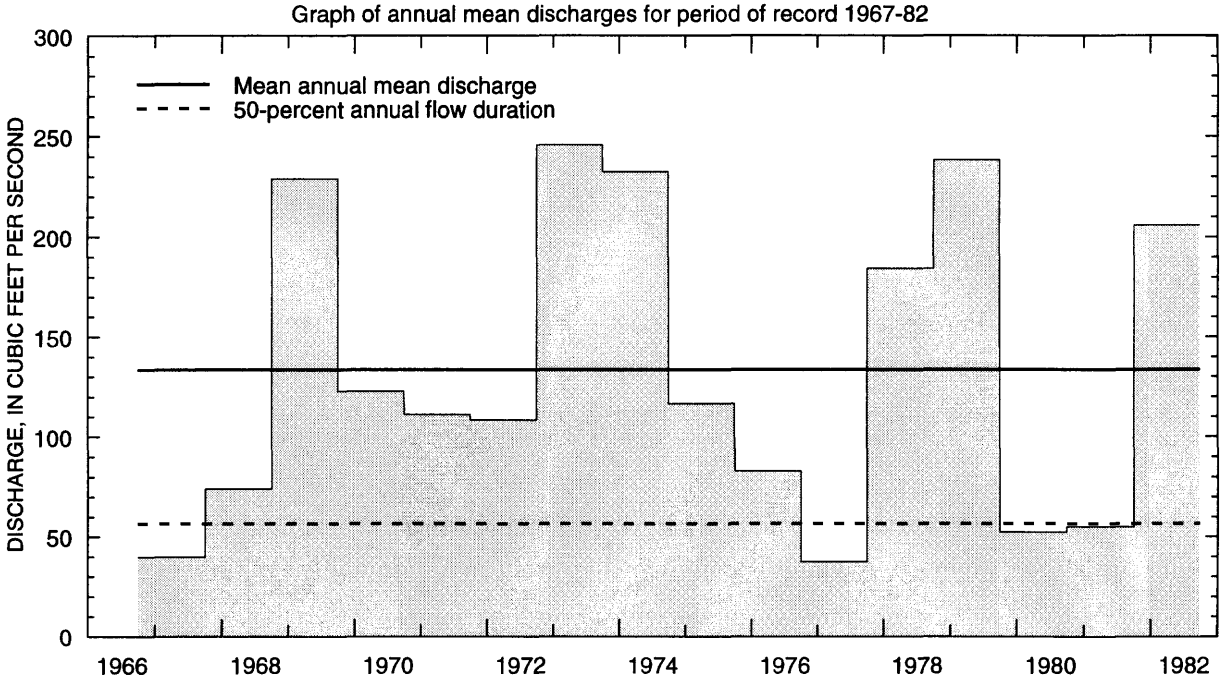
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	30	6.0	972
2.7	62	8.0	1790
3.0	112	10.0	2960
3.5	214	12.0	4600
4.0	336	14.0	7050
5.0	628		

05464640 PRAIRIE CREEK AT FAIRFAX, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1967-82

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	220	1978	5.00	1977	66.0	64.7
November	187	1973	4.78	1977	70.3	58.1
December	248	1973	1.66	1977	66.1	61.6
January	339	1973	0.23	1977	72.4	91.2
February	345	1971	32.2	1968	102	83.8
March	961	1979	36.7	1968	256	235
April	695	1973	9.20	1977	233	186
May	865	1974	4.81	1977	234	226
June	506	1969	2.04	1977	184	148
July	844	1969	0.97	1977	149	217
August	299	1979	9.24	1976	105	100
September	137	1978	3.84	1976	62.0	42.5
Annual	246	1973	37.5	1977	134	76.9

Graph of annual mean discharges for period of record 1967-82



05464640 PRAIRIE CREEK AT FAIRFAX, IOWA—Continued

Monthly and annual flow durations, based on period of record 1967-82

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	4.0	4.2	1.5	0.11	0.11	12	7.3	3.1	1.2	0.00	1.8	2.9	0.47
95	5.5	5.3	1.9	0.36	6.8	21	11	5.8	2.7	1.8	8.6	4.3	5.8
90	8.2	8.8	6.0	5.8	15	29	43	27	22	18	12	8.5	10
85	9.3	11	9.7	6.6	16	34	54	35	36	23	13	10	15
80	11	12	13	10	21	40	60	42	48	28	14	13	21
75	15	19	19	16	26	45	66	50	58	33	16	17	26
70	21	24	23	18	28	62	73	59	67	38	20	19	32
60	30	35	33	25	34	90	100	89	83	47	30	26	43
50	38	49	48	35	39	117	132	116	107	56	39	32	56
40	47	64	65	43	47	143	173	167	138	67	51	43	76
30	70	84	73	51	62	193	232	223	178	90	69	55	105
25	83	102	80	64	78	220	264	254	199	104	79	61	126
20	98	114	88	80	100	280	304	301	233	124	98	75	157
15	116	136	98	95	130	374	367	370	292	166	131	95	201
10	147	166	122	130	233	618	545	503	367	276	203	133	278
5	214	195	160	280	390	930	706	764	528	524	372	208	466

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 16 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	616
0.95	1.05	1,040
0.90	1.11	1,350
0.80	1.25	1,830
0.50	2	3,140
0.20	5	5,110
0.10	10	6,460
0.04	25	8,180
0.02	50	9,440
0.01	100	10,700
0.005	200	11,900

Magnitude and frequency of annual high discharges, based on period of record 1967-82

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	192	113	73	46
0.95	1.05	399	235	150	97
0.90	1.11	569	335	213	139
0.80	1.25	846	499	316	210
0.50	2	1,650	979	613	424
0.20	5	2,870	1,710	1,060	769
0.10	10	3,660	2,200	1,350	1,010
0.04	25	4,620	2,790	1,700	1,310
0.02	50	5,280	3,200	1,940	1,530
0.01	100	5,890	3,580	2,170	1,740
0.005	200	6,470	3,940	2,370	1,940

05464640 PRAIRIE CREEK AT FAIRFAX, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1967 to March 1982

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.03	0.03	0.18	0.44	0.87	1.6
0.02	50	0.00	0.00	0.01	0.08	0.10	0.39	0.85	1.5	2.8
0.05	20	0.00	0.00	0.11	0.35	0.45	1.2	2.1	3.1	6.1
0.10	10	0.31	0.31	0.47	1.1	1.4	2.7	4.3	5.7	11
0.20	5	2.6	2.7	2.9	3.3	4.1	6.5	9.1	11	21
0.50	2	12	13	15	15	18	23	28	32	52
0.80	1.25	23	25	33	33	39	50	61	71	90
0.90	1.11	25	27	40	40	47	64	81	99	108
0.96	1.04	25	27	44	45	52	76	100	132	140
0.98	1.02	25	27	46	47	54	82	111	154	160
0.99	1.01	25	27	46	48	55	86	120	174	180

Magnitude and frequency of seasonal low discharges, based on period of record October 1966 to September 1982

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.05	0.05	0.06	0.24	0.51	0.72	1.1
0.02	50	0.14	0.15	0.15	0.20	0.65	1.2	1.6	2.3
0.05	20	0.60	0.66	0.69	0.96	2.5	3.7	4.6	6.5
0.10	10	1.8	2.0	2.2	3.1	6.5	8.6	10	14
0.20	5	5.3	6.2	6.7	9.5	17	20	23	32
0.50	2	22	25	27	39	53	59	69	99
0.80	1.25	45	48	51	72	86	101	127	189
0.90	1.11	53	55	58	82	94	115	150	227
0.96	1.04	58	58	61	87	98	122	165	256
0.98	1.02	59	59	62	88	99	125	171	268
0.99	1.01	60	60	63	88	99	126	174	275
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.21	0.28	0.27	0.71	0.84	0.85
0.02	50	0.00	0.04	0.47	0.60	0.56	1.2	1.4	1.5
0.05	20	0.00	0.31	1.4	1.7	1.5	2.4	2.9	3.2
0.10	10	1.3	1.4	3.1	3.7	3.1	4.4	5.3	5.9
0.20	5	5.3	5.4	7.1	8.4	6.8	8.2	9.9	12
0.50	2	16	24	25	27	22	23	27	33
0.80	1.25	28	37	40	55	46	49	55	70
0.90	1.11	36	39	47	69	60	67	73	93
0.96	1.04	45	47	53	81	73	88	93	119
0.98	1.02	51	53	55	87	79	101	106	135
0.99	1.01	56	58	60	90	84	114	117	149

05465000 CEDAR RIVER NEAR CONESVILLE, IOWA

LOCATION.—Lat 41°24'36", long 91°17'06", in SW1/4 SW1/4 sec. 2, T76N, R4W, Muscatine County, Hydrologic Unit 07080206, on right bank 10 ft downstream from bridge on County Highway G28, 3.4 mi northeast of Conesville, 5.2 mi downstream from Wapsinonoc Creek, 10.7 mi upstream from mouth, and at mile 39.8 upstream from mouth of Iowa River.

DRAINAGE AREA.—7,785 mi^2.

PERIOD OF RECORD.—September 1939 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 581.95 ft above sea level. Prior to February 2, 1940, and April 11, 1952, to July 1, 1954, non-recording gage, February 2, 1940, to April 10, 1952, and July 2, 1954 to September 16, 1963, water-stage recorder, at site 150 ft downstream on left bank at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 74,000 ft^3/s, April 6, 1993, gage height, 17.11 ft; minimum daily discharge, 250 ft^3/s, November 28, 1955.

Selected values from rating table number 6, developed October 1988

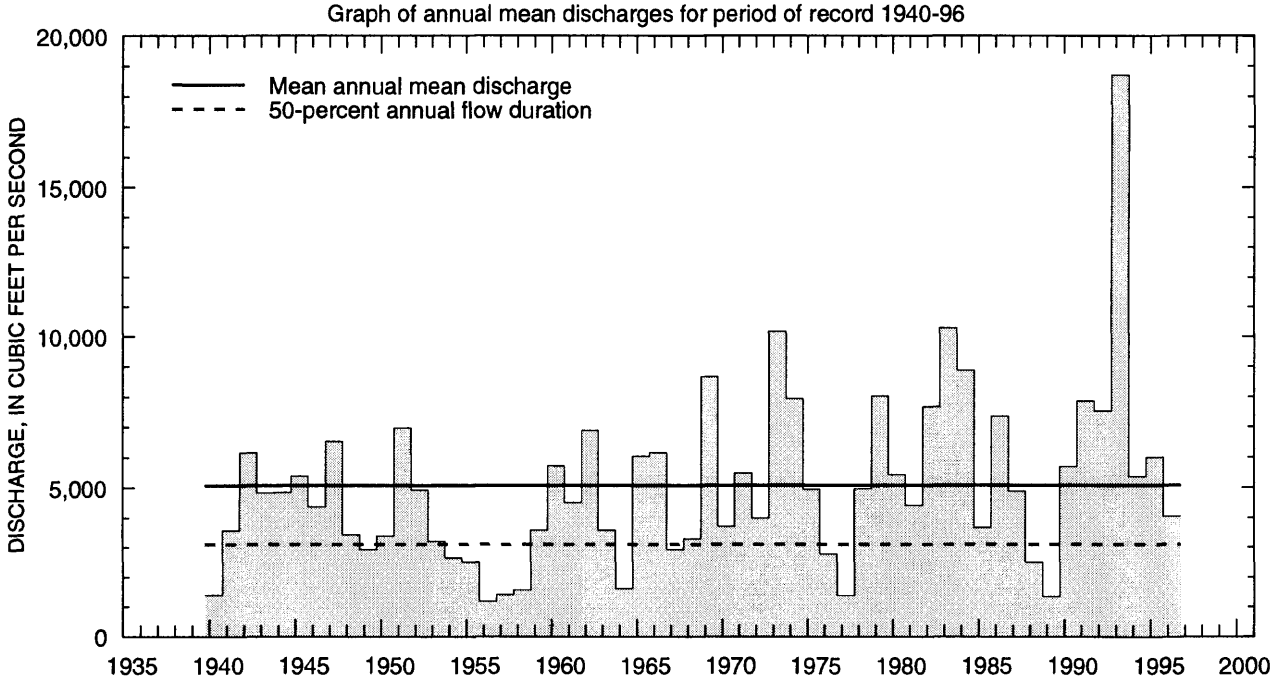
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	475	8.0	5,380
4.5	820	10.0	9,940
5.0	1,230	12.0	16,200
6.0	2,260	14.0	29,600
7.0	3,640	17.0	70,800

05465000 CEDAR RIVER NEAR CONESVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1940-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	12,380	1987	599	1957	3,115	2,595
November	10,240	1973	590	1956	3,308	2,568
December	11,110	1983	429	1990	2,608	2,217
January	11,860	1973	365	1977	2,410	2,124
February	12,000	1984	359	1940	3,163	2,308
March	17,590	1948	1,056	1954	8,067	4,605
April	36,790	1993	1,244	1957	9,430	7,264
May	24,440	1991	1,219	1940	7,309	5,326
June	27,780	1993	768	1977	7,765	5,728
July	42,110	1993	815	1989	6,139	6,831
August	34,190	1993	700	1989	4,182	5,091
September	19,530	1993	620	1955	3,339	3,095
Annual	18,710	1993	1,176	1956	5,075	2,921

Graph of annual mean discharges for period of record 1940-96



05465000 CEDAR RIVER NEAR CONESVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1940-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	592	470	380	340	353	796	1,100	974	742	674	641	562	450
95	678	673	514	450	510	1,140	1,600	1,390	1,170	930	863	763	709
90	735	774	598	560	700	1,460	2,120	2,020	1,760	1,350	1,050	892	900
85	821	857	700	760	850	1,840	2,880	2,510	2,240	1,650	1,180	1,040	1,110
80	946	981	822	870	1,050	2,440	3,400	2,860	2,680	1,980	1,440	1,230	1,350
75	1,060	1,200	1,030	1,000	1,200	3,080	3,850	3,290	3,160	2,270	1,640	1,410	1,600
70	1,240	1,470	1,150	1,100	1,300	3,600	4,290	3,650	3,640	2,550	1,780	1,540	1,840
60	1,700	2,000	1,560	1,400	1,550	4,600	5,110	4,310	4,560	3,280	2,100	1,790	2,380
50	2,160	2,490	1,950	1,700	2,000	5,600	6,630	5,160	5,720	4,060	2,440	2,160	3,100
40	2,820	3,200	2,300	2,020	2,500	7,080	8,300	6,390	6,850	4,920	2,980	2,660	4,000
30	3,640	4,040	2,800	2,500	3,300	9,620	10,900	7,910	8,630	6,290	3,670	3,250	5,120
25	4,140	4,480	3,290	2,750	3,700	11,100	12,100	9,110	9,990	7,080	4,200	3,630	6,000
20	4,730	4,910	3,750	3,100	4,300	13,000	14,000	10,700	11,500	8,150	4,800	4,140	7,110
15	5,490	5,400	4,360	3,500	5,200	15,300	15,900	13,000	13,500	9,420	5,920	4,920	8,710
10	6,570	6,580	5,300	4,500	6,620	18,200	19,500	16,000	16,400	11,300	7,830	6,350	11,600
5	8,730	8,810	7,430	6,550	10,000	23,200	26,600	21,300	22,400	17,400	13,500	10,400	16,600

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 63 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	4,320
0.95	1.05	7,910
0.90	1.11	10,700
0.80	1.25	15,000
0.50	2	26,700
0.20	5	43,900
0.10	10	55,100
0.04	25	68,600
0.02	50	78,100
0.01	100	87,100
0.005	200	95,600

Magnitude and frequency of annual high discharges, based on period of record 1940-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	3,460	3,000	2,510	2,100
0.95	1.05	6,700	5,800	4,710	3,910
0.90	1.11	9,230	7,960	6,390	5,280
0.80	1.25	13,200	11,300	9,020	7,410
0.50	2	24,000	20,300	16,100	13,100
0.20	5	39,100	32,600	26,100	20,900
0.10	10	48,500	40,100	32,400	25,700
0.04	25	59,400	48,500	39,800	31,300
0.02	50	66,700	54,000	44,800	35,100
0.01	100	73,300	58,900	49,400	38,500
0.005	200	79,300	63,400	53,700	41,700

05465000 CEDAR RIVER NEAR CONESVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	219	240	257	271	293	316	333	352	403
0.02	50	262	287	309	325	352	383	409	434	501
0.05	20	341	373	402	423	459	507	550	591	689
0.10	10	428	466	504	531	578	647	711	770	906
0.20	5	558	605	656	694	756	859	959	1,050	1,250
0.50	2	904	969	1,050	1,120	1,230	1,440	1,650	1,840	2,230
0.80	1.25	1,410	1,500	1,620	1,750	1,930	2,310	2,720	3,100	3,800
0.90	1.11	1,760	1,850	2,000	2,170	2,420	2,930	3,480	4,010	4,950
0.96	1.04	2,210	2,300	2,470	2,710	3,030	3,720	4,480	5,210	6,470
0.98	1.02	2,540	2,620	2,810	3,110	3,490	4,320	5,240	6,140	7,640
0.99	1.01	2,870	2,950	3,150	3,500	3,960	4,920	6,000	7,070	8,840

Magnitude and frequency of seasonal low discharges, based on period of record October 1939 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	245	247	260	281	492	531	556	665
0.02	50	294	302	317	344	611	662	701	834
0.05	20	385	406	426	466	839	914	984	1,170
0.10	10	488	523	551	608	1,110	1,210	1,320	1,560
0.20	5	646	706	746	837	1,530	1,680	1,850	2,190
0.50	2	1,090	1,220	1,310	1,520	2,790	3,070	3,440	4,100
0.80	1.25	1,800	2,040	2,230	2,740	4,910	5,430	6,120	7,420
0.90	1.11	2,320	2,630	2,920	3,700	6,510	7,210	8,120	9,990
0.96	1.04	3,020	3,430	3,870	5,090	8,730	9,660	10,900	13,600
0.98	1.02	3,570	4,040	4,620	6,230	10,500	11,600	13,000	16,400
0.99	1.01	4,150	4,670	5,400	7,470	12,300	13,600	15,200	19,500
		July-August-September				October-November-December			
0.01	100	497	529	551	629	209	273	281	302
0.02	50	538	571	597	679	255	332	346	374
0.05	20	617	651	683	776	342	442	469	513
0.10	10	708	745	784	892	442	567	611	674
0.20	5	856	899	950	1,080	599	761	834	930
0.50	2	1,330	1,400	1,490	1,730	1,050	1,300	1,470	1,680
0.80	1.25	2,290	2,430	2,610	3,150	1,810	2,170	2,510	2,930
0.90	1.11	3,180	3,410	3,670	4,550	2,380	2,790	3,270	3,860
0.96	1.04	4,690	5,080	5,500	7,070	3,160	3,620	4,300	5,140
0.98	1.02	6,150	6,710	7,300	9,630	3,780	4,270	5,100	6,150
0.99	1.01	7,950	8,760	9,560	12,900	4,440	4,930	5,930	7,210

05465500 IOWA RIVER AT WAPELLO, IOWA

LOCATION.—Lat 41°10'41", long 91°10'55", in NW1/4 SE1/4 sec. 27, T74N, R3W, Louisa County, Hydrologic Unit 07080209, on right bank, 1,200 ft downstream from bridge on State Highway 99 at east edge of Wapello, 13.2 mi downstream from Cedar River, and at mile 15.8.

DRAINAGE AREA.—12,499 mi^2.

PERIOD OF RECORD.—October 1914 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 538.17 ft above sea level. October 1, 1914 to April 15, 1934, nonrecording gage and April 16, 1934 to September 30, 1972, water-stage recorder at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 111,000 ft^3/s, July 8, 1993; maximum gage height, 29.53 ft, July 7, 1993, prior to break in levee downstream from gage; minimum daily discharge, 300 ft^3/s, November 28, 1955.

REMARKS.—Flow regulated since September 17, 1958, by Coralville Dam and Reservoir (station 05453510) 67.3 mi upstream.

Selected values from rating table number 15, developed March 1994

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
10.0	1,970	16.0	16,700
11.0	3,650	18.0	23,600
12.0	5,700	21.0	39,700
13.0	8,060	25.0	77,100
14.0	10,700	29.0	130,000

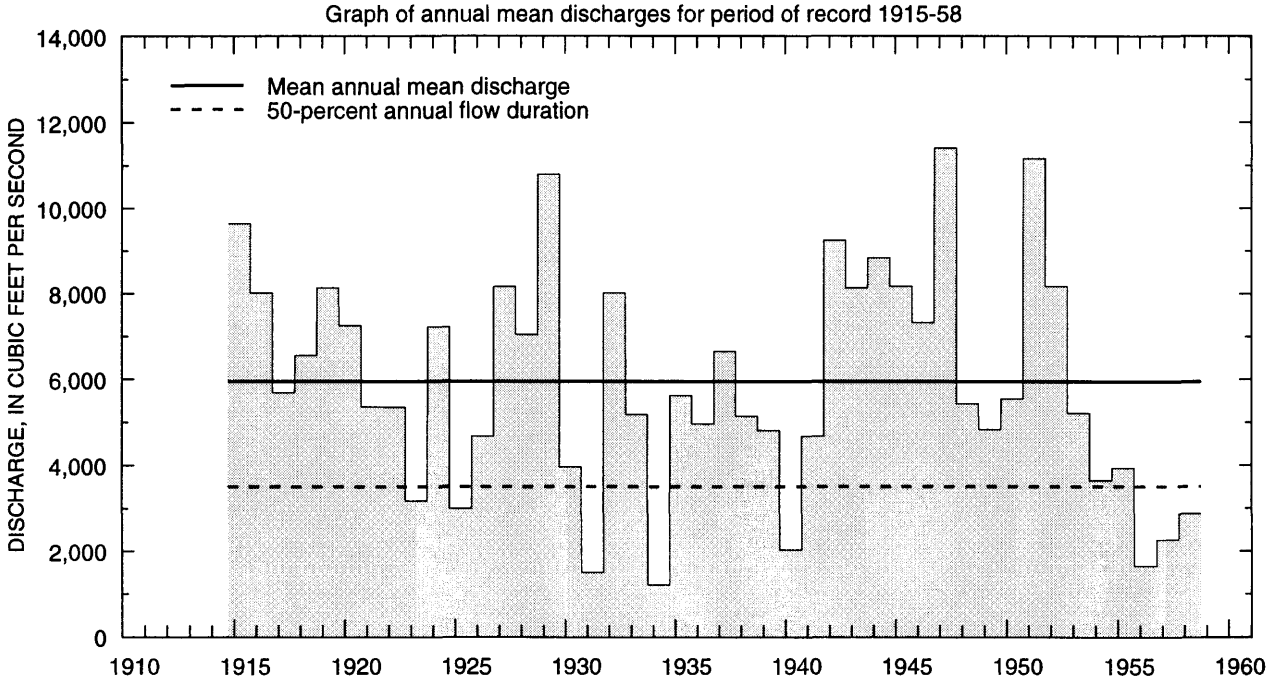
05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1915-58

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	13,070	1916	718	1957	3,557	3,073
November	15,500	1929	774	1956	3,718	3,319
December	11,770	1932	604	1956	2,707	2,316
January	15,670	1946	503	1956	2,822	2,713
February	16,990	1915	497	1940	4,975	3,235
March	31,210	1929	1,231	1931	11,430	7,398
April	37,200	1951	1,967	1957	10,270	6,962
May	24,790	1944	865	1934	8,018	5,437
June	46,810	1947	604	1934	10,140	8,548
July	19,440	1947	1,100	1936	5,833	4,124
August	17,860	1924	588	1931	4,024	3,382
September	17,290	1926	826	1955	3,921	3,494
Annual	11,410	1947	1,211	1934	5,947	2,608

Graph of annual mean discharges for period of record 1915-58



05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1915-58

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	677	752	550	430	480	1,000	1,430	816	597	641	570	719	580
95	880	880	660	600	604	1,250	1,970	1,540	1,310	990	825	884	839
90	974	1,010	800	690	860	1,850	2,680	2,080	2,100	1,420	1,110	1,030	1,050
85	1,060	1,070	948	800	1,100	2,770	3,270	2,460	2,530	1,810	1,310	1,110	1,250
80	1,150	1,170	1,000	940	1,390	3,860	3,980	3,000	2,840	2,340	1,500	1,210	1,500
75	1,300	1,300	1,100	1,080	1,600	4,500	4,590	3,370	3,280	2,710	1,660	1,360	1,750
70	1,420	1,630	1,280	1,270	1,850	5,180	5,190	3,980	4,050	3,070	1,850	1,500	2,020
60	1,770	2,080	1,560	1,500	2,320	6,500	6,460	4,990	5,590	3,720	2,310	1,880	2,680
50	2,090	2,530	1,830	1,800	3,000	8,110	7,720	6,220	6,980	4,400	2,690	2,380	3,510
40	2,740	3,160	2,300	2,200	4,170	10,000	9,100	7,510	8,630	5,180	3,240	2,910	4,600
30	3,880	3,860	2,860	2,800	5,680	12,500	11,500	8,950	11,000	6,400	3,900	3,680	6,240
25	4,520	4,500	3,250	3,200	6,500	14,700	13,200	10,200	12,400	6,990	4,540	4,540	7,270
20	5,180	4,970	3,700	3,760	7,420	17,000	15,700	11,700	14,800	7,850	5,220	5,600	8,530
15	6,430	5,620	4,100	4,200	8,740	20,600	18,000	13,400	17,700	9,430	6,090	6,760	10,400
10	7,920	7,390	5,300	5,000	10,100	26,100	21,700	15,900	22,100	11,300	8,540	8,350	13,400
5	10,500	11,000	8,000	7,480	14,500	34,200	27,100	21,400	30,000	15,600	12,500	11,200	19,700

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 56 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	6,250
0.95	1.05	11,300
0.90	1.11	15,100
0.80	1.25	20,900
0.50	2	36,100
0.20	5	56,500
0.10	10	69,100
0.04	25	83,400
0.02	50	92,900
0.01	100	102,000
0.005	200	110,000

Magnitude and frequency of annual high discharges, based on period of record 1915-58

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	3,950	3,220	2,370	1,980
0.95	1.05	8,430	7,070	5,400	4,350
0.90	1.11	12,000	10,200	7,900	6,260
0.80	1.25	17,700	15,200	11,900	9,280
0.50	2	32,600	28,200	22,300	17,100
0.20	5	51,300	44,500	35,000	26,800
0.10	10	61,700	53,300	41,500	31,800
0.04	25	72,200	62,100	47,900	36,800
0.02	50	78,500	67,200	51,500	39,700
0.01	100	83,700	71,300	54,300	42,000
0.005	200	88,000	74,700	56,500	43,800

05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1915 to March 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	314	357	358	368	369	393	453	477	562
0.02	50	352	395	399	415	421	457	525	563	663
0.05	20	421	461	474	496	517	576	659	722	851
0.10	10	495	533	555	583	622	707	809	901	1,060
0.20	5	603	639	674	712	779	907	1,040	1,180	1,400
0.50	2	892	925	993	1,060	1,200	1,470	1,710	1,970	2,370
0.80	1.25	1,340	1,380	1,490	1,620	1,880	2,400	2,870	3,310	4,050
0.90	1.11	1,660	1,720	1,860	2,040	2,380	3,100	3,790	4,330	5,390
0.96	1.04	2,110	2,190	2,370	2,610	3,070	4,090	5,130	5,790	7,320
0.98	1.02	2,460	2,580	2,780	3,080	3,620	4,900	6,260	6,980	8,930
0.99	1.01	2,830	3,000	3,210	3,590	4,210	5,770	7,500	8,260	10,700

Magnitude and frequency of seasonal low discharges, based on period of record October 1914 to September 1958

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	350	351	355	361	493	550	590	676
0.02	50	410	412	420	436	626	694	747	865
0.05	20	506	511	523	578	883	972	1,050	1,240
0.10	10	617	626	656	744	1,180	1,300	1,410	1,680
0.20	5	776	810	863	1,010	1,660	1,810	1,990	2,400
0.50	2	1,220	1,330	1,450	1,830	3,020	3,290	3,680	4,540
0.80	1.25	1,930	2,180	2,410	3,310	5,160	5,670	6,430	8,140
0.90	1.11	2,470	2,830	3,140	4,530	6,680	7,380	8,440	10,800
0.96	1.04	3,220	3,730	4,150	6,340	8,630	9,620	11,100	14,400
0.98	1.02	3,830	4,460	4,960	7,890	10,100	11,300	13,100	17,200
0.99	1.01	4,490	5,250	5,820	9,600	11,600	13,100	15,200	20,100
		July-August-September				October-November-December			
0.01	100	399	476	505	542	322	410	443	533
0.02	50	453	531	564	615	372	465	503	597
0.05	20	552	633	672	752	464	566	611	714
0.10	10	662	748	795	908	566	677	732	847
0.20	5	834	926	989	1,160	722	846	916	1,050
0.50	2	1,340	1,450	1,580	1,910	1,160	1,320	1,440	1,670
0.80	1.25	2,220	2,420	2,680	3,340	1,880	2,120	2,330	2,790
0.90	1.11	2,950	3,230	3,630	4,570	2,430	2,740	3,030	3,730
0.96	1.04	4,040	4,480	5,140	6,510	3,210	3,640	4,050	5,180
0.98	1.02	4,990	5,600	6,500	8,250	3,850	4,390	4,920	6,470
0.99	1.01	6,050	6,880	8,100	10,300	4,550	5,220	5,870	7,950

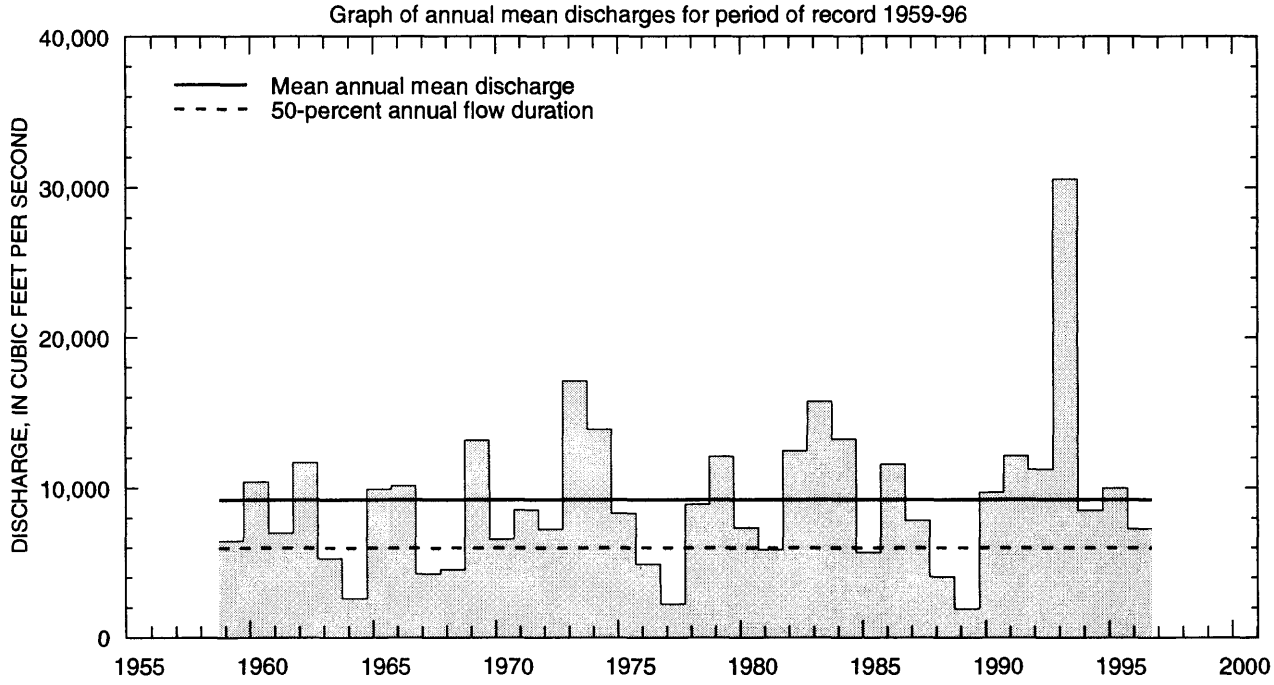
05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	17,200	1987	926	1990	5,496	4,075
November	16,080	1993	882	1990	6,183	4,300
December	18,150	1983	664	1990	5,425	4,012
January	20,420	1973	533	1977	4,563	3,895
February	17,080	1984	661	1977	6,019	4,047
March	26,130	1982	2,273	1977	13,710	7,339
April	45,840	1993	2,536	1977	16,250	11,060
May	33,030	1993	1,709	1977	13,460	8,577
June	36,630	1993	1,022	1977	13,110	8,894
July	77,320	1993	1,019	1989	11,870	13,520
August	61,750	1993	873	1989	8,014	10,160
September	37,270	1993	982	1988	6,297	6,413
Annual	30,550	1993	1,908	1989	9,210	5,119

Graph of annual mean discharges for period of record 1959-96



05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	871	800	620	488	540	1,200	2,110	1,610	935	930	827	880	749
95	1,020	1,050	800	819	1,050	2,290	3,070	2,740	1,820	1,290	1,180	1,140	1,150
90	1,290	1,280	1,050	1,120	1,500	2,800	4,130	3,790	3,020	2,250	1,620	1,620	1,650
85	1,410	1,600	1,500	1,400	2,000	3,300	4,960	4,530	3,660	2,950	2,120	1,890	2,200
80	1,660	2,040	2,000	1,700	2,250	4,610	5,950	5,150	4,620	3,370	2,510	2,100	2,660
75	2,200	2,950	2,500	1,960	2,450	5,750	6,700	5,840	5,360	4,030	2,800	2,340	3,060
70	2,770	3,280	2,730	2,200	2,650	6,640	7,600	6,490	6,450	4,740	3,080	2,560	3,500
60	3,500	3,950	3,400	2,700	3,300	8,460	9,710	8,250	8,700	6,280	3,740	3,110	4,580
50	4,290	4,760	4,000	3,280	4,020	10,800	11,900	10,800	10,600	8,590	4,850	3,700	5,990
40	5,270	6,280	5,360	4,000	4,900	13,500	15,600	13,000	13,300	10,900	6,350	4,690	7,730
30	6,770	7,810	6,410	4,800	6,040	17,000	20,300	16,200	15,800	12,900	8,150	6,510	10,000
25	7,330	8,430	7,120	5,400	6,990	19,800	22,300	18,400	17,400	13,900	9,030	7,480	11,500
20	8,210	9,150	8,000	6,000	8,000	22,400	24,900	20,700	19,400	15,300	9,930	8,410	13,600
15	9,620	10,300	9,530	7,200	9,370	25,600	28,200	23,400	21,900	16,600	11,500	10,100	16,500
10	11,200	11,900	11,300	9,000	13,000	29,000	33,200	27,200	26,800	19,900	15,800	12,400	20,800
5	14,200	15,000	15,000	13,000	20,800	34,100	42,500	32,900	34,100	32,800	23,100	20,400	28,200

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05465500 IOWA RIVER AT WAPELLO, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1959 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	371	397	435	445	472	503	517	562	676
0.02	50	460	491	536	551	586	632	664	724	881
0.05	20	626	663	722	748	799	876	948	1,040	1,280
0.10	10	810	853	925	964	1,040	1,160	1,280	1,410	1,750
0.20	5	1,090	1,140	1,220	1,290	1,400	1,590	1,800	2,000	2,480
0.50	2	1,800	1,860	1,980	2,110	2,340	2,770	3,250	3,650	4,450
0.80	1.25	2,770	2,820	2,960	3,200	3,660	4,520	5,410	6,120	7,230
0.90	1.11	3,380	3,430	3,560	3,880	4,510	5,700	6,850	7,790	8,970
0.96	1.04	4,100	4,130	4,260	4,670	5,540	7,170	8,630	9,840	11,000
0.98	1.02	4,600	4,610	4,720	5,210	6,260	8,230	9,890	11,300	12,400
0.99	1.01	5,060	5,070	5,150	5,700	6,940	9,260	11,100	12,700	13,600

Magnitude and frequency of seasonal low discharges, based on period of record
October 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	396	436	458	521	799	823	870	1,050
0.02	50	493	537	564	646	1,000	1,050	1,130	1,360
0.05	20	677	728	766	884	1,400	1,500	1,650	1,990
0.10	10	887	948	999	1,160	1,870	2,040	2,280	2,750
0.20	5	1,220	1,290	1,370	1,610	2,630	2,910	3,300	3,980
0.50	2	2,140	2,290	2,450	2,940	4,950	5,540	6,340	7,650
0.80	1.25	3,570	3,900	4,250	5,220	9,000	10,000	11,400	13,700
0.90	1.11	4,580	5,100	5,600	6,980	12,200	13,400	15,000	18,200
0.96	1.04	5,880	6,710	7,470	9,430	16,600	17,900	19,800	24,000
0.98	1.02	6,870	7,970	8,950	11,400	20,200	21,500	23,500	28,400
0.99	1.01	7,850	9,280	10,500	13,500	23,900	25,200	27,200	32,800
		July-August-September				October-November-December			
0.01	100	825	835	837	870	344	431	436	454
0.02	50	886	901	902	964	446	550	567	600
0.05	20	1,000	1,030	1,040	1,150	646	782	823	892
0.10	10	1,150	1,180	1,220	1,370	882	1,050	1,130	1,240
0.20	5	1,380	1,440	1,500	1,740	1,260	1,470	1,610	1,810
0.50	2	2,180	2,310	2,490	3,030	2,320	2,650	2,970	3,420
0.80	1.25	3,960	4,270	4,750	6,030	3,960	4,410	5,040	5,870
0.90	1.11	5,740	6,240	7,050	9,140	5,070	5,600	6,430	7,500
0.96	1.04	8,950	9,800	11,300	14,900	6,450	7,060	8,150	9,490
0.98	1.02	12,200	13,500	15,700	20,900	7,440	8,120	9,380	10,900
0.99	1.01	16,500	18,300	21,500	28,800	8,400	9,130	10,600	12,200

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05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA

LOCATION.—Lat 42°04'06", long 93°37'09", in NW1/4 SW1/4 sec. 23, T84N, R24W, Story County, Hydrologic Unit 07080105, on left bank 2.5 mi north of Ames, 3.5 mi downstream from Keigley Branch, 5.2 mi upstream from Squaw Creek and at mile 228.1 upstream from mouth of Skunk River.

DRAINAGE AREA.—315 mi^2.

PERIOD OF RECORD.—October 1920 to September 1927, October 1932 to September 1995 (discontinued). Prior to October 1966, published as "Skunk River near Ames."

GAGE.—Water-stage recorder. Concrete control since July 21, 1934. Datum of gage is 893.61 ft above sea level (Iowa Highway Commission benchmark). Prior to August 25, 1921, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 11,200 ft^3/s, August 16, 1993, gage height, 14.23 ft; no flow many days in 1934, 1953-56, 1976-77.

REMARKS.—Gaging station reactivated September 1996. Flood of June 17, 1996 reached about 14,000 ft^3/s, from rating-curve extension, gage height 15.89 ft, from highwater mark.

Selected values from rating table number 4, developed October 1992

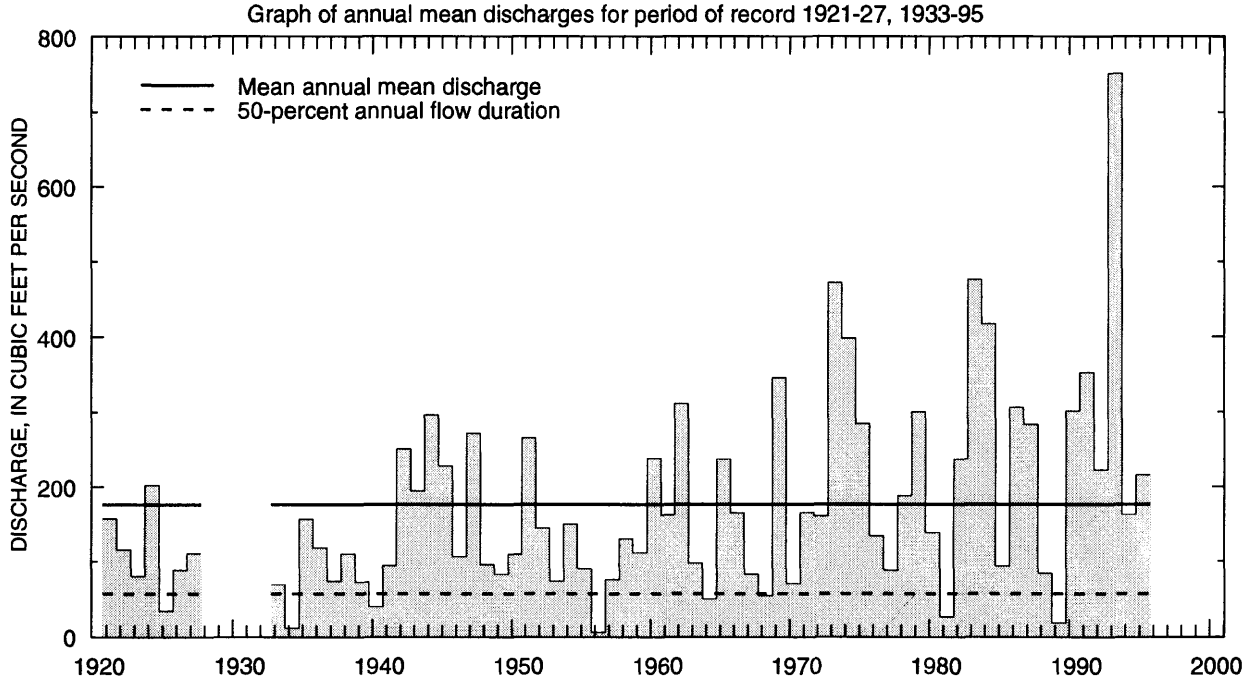
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	13.0	7.0	3,070
2.5	77.5	8.0	4,080
3.0	200	9.0	5,070
4.0	606	10.0	6,120
5.0	1,250	12.0	8,410
6.0	2,120	14.5	11,600

05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1921-27, 1933-95

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	723	1987	0.12	1954	97.2	143
November	726	1973	0.14	1956	96.4	127
December	537	1983	0.000	1977	69.6	92.5
January	315	1973	0.000	1977	50.2	64.3
February	623	1984	0.31	1956	116	133
March	1,034	1979	6.35	1981	317	252
April	1,208	1965	6.67	1956	277	277
May	1,193	1944	2.28	1934	273	263
June	1,900	1947	0.011	1977	371	397
July	2,628	1993	0.017	1977	224	378
August	1,782	1993	0.087	1934	117	244
September	577	1926	0.081	1976	99.4	154
Annual	752	1993	5.58	1956	176	131

Graph of annual mean discharges for period of record 1921-27, 1933-95



05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1921-27, 1933-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.10	0.00	0.00	0.00	1.0	6.0	0.77	0.00	0.00	0.00	0.00	0.00
95	0.40	1.0	0.50	0.17	0.40	7.6	12	7.2	3.0	1.1	0.38	0.28	0.76
90	0.80	2.3	1.7	0.80	1.6	15	21	14	14	3.0	1.3	0.90	2.2
85	1.5	3.3	2.4	1.7	3.7	29	34	30	26	6.0	2.3	1.8	4.3
80	2.6	4.8	3.2	2.8	5.3	40	48	46	36	10	3.9	2.7	7.5
75	4.7	8.4	5.0	4.3	8.0	57	67	58	48	17	5.4	3.9	12
70	7.7	13	8.0	6.1	13	74	80	74	62	22	7.2	5.5	18
60	15	29	20	12	22	101	110	103	92	44	13	10	34
50	26	48	33	21	35	147	145	136	153	71	22	20	57
40	50	73	50	34	55	219	203	193	223	105	36	35	88
30	83	104	72	50	83	310	290	263	329	158	60	55	136
25	110	123	87	60	104	376	345	321	394	207	79	72	174
20	147	151	107	76	130	452	405	394	488	259	110	102	225
15	196	176	136	93	181	570	507	486	630	350	160	150	303
10	260	225	174	110	285	800	642	663	918	525	254	239	429
5	389	338	249	169	500	1,260	940	990	1,610	893	487	477	725

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 73 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,050
0.90	1.11	1,360
0.80	1.25	1,840
0.50	2	3,140
0.20	5	5,030
0.10	10	6,310
0.04	25	7,890
0.02	50	9,040
0.01	100	10,200
0.005	200	11,200

Magnitude and frequency of annual high discharges, based on period of record 1921-27, 1933-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	204	138	81	48
0.95	1.05	455	302	190	124
0.90	1.11	662	439	284	193
0.80	1.25	998	662	441	308
0.50	2	1,920	1,300	889	634
0.20	5	3,150	2,210	1,520	1,060
0.10	10	3,850	2,760	1,890	1,290
0.04	25	4,600	3,390	2,300	1,520
0.02	50	5,050	3,800	2,550	1,650
0.01	100	5,440	4,160	2,770	1,750
0.005	200	5,760	4,480	2,960	1,830

05470000 SOUTH SKUNK RIVER NEAR AMES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1921 to March 1927, April 1933 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.16
0.02	50	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.23	0.35
0.05	20	0.00	0.00	0.00	0.00	0.00	0.11	0.31	0.66	1.0
0.10	10	0.03	0.04	0.05	0.07	0.17	0.40	0.92	1.6	2.5
0.20	5	0.30	0.34	0.42	0.54	0.74	1.4	2.8	4.2	6.8
0.50	2	2.2	2.4	2.7	3.3	5.1	9.7	15	20	33
0.80	1.25	10	11	12	13	20	38	55	74	117
0.90	1.11	20	21	23	26	37	64	96	129	198
0.96	1.04	39	40	45	50	63	102	156	215	320
0.98	1.02	58	61	67	76	86	129	205	287	417
0.99	1.01	83	87	97	110	112	154	256	362	515

Magnitude and frequency of seasonal low discharges, based on period of record August 1920 to September 1927, October 1932 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.39
0.05	20	0.03	0.05	0.06	0.19	0.74	1.0	1.1	3.0
0.10	10	0.32	0.45	0.52	0.82	2.7	3.8	4.1	8.2
0.20	5	1.2	1.6	1.8	2.9	8.1	11	15	22
0.50	2	7.5	9.3	11	17	37	45	71	93
0.80	1.25	29	34	39	60	105	125	160	242
0.90	1.11	51	59	68	100	157	191	220	345
0.96	1.04	85	98	115	156	221	280	220	457
0.98	1.02	114	131	155	198	264	346	460	525
0.99	1.01	145	166	199	238	302	411	490	581
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03
0.05	20	0.00	0.00	0.03	0.13	0.00	0.06	0.13	0.29
0.10	10	0.09	0.18	0.24	0.46	0.26	0.31	0.52	0.91
0.20	5	0.48	0.70	0.88	1.6	1.1	1.2	1.8	2.9
0.50	2	3.6	4.6	5.9	11	7.4	9.4	12	18
0.80	1.25	17	21	27	48	32	42	51	72
0.90	1.11	36	43	54	86	60	79	96	130
0.96	1.04	72	86	106	145	112	139	174	222
0.98	1.02	111	132	158	193	160	190	247	300
0.99	1.01	163	191	223	241	218	244	329	382

05470500 SQUAW CREEK AT AMES, IOWA

LOCATION.—Lat 42°01'21", long 93°37'45", in NE1/4 NW1/4 sec. 10, T83N, R24W, Story County, Hydrologic Unit 07080105, on left bank 65 ft downstream from Lincoln Way Bridge in Ames, 0.2 mi downstream from College Creek, and 2.4 mi upstream from mouth.

DRAINAGE AREA.—204 mi^2.

PERIOD OF RECORD.—May 1919 to September 1927, May 1965 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder and concrete control. Datum of gage is 881.00 ft above sea level (levels by Iowa State University). Prior to March 11, 1925, nonrecording gage at site 0.6 mi upstream at different datum. March 11, 1925 to April 30, 1927, nonrecording gage at site 65 ft upstream at datum about 4 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 24,300 ft^3/s, July 9, 1993, gage height, 18.54 ft; no flow many days in 1925, 1971, 1972, 1976-77, 1988.

Selected values from rating table number 9, developed October 1996

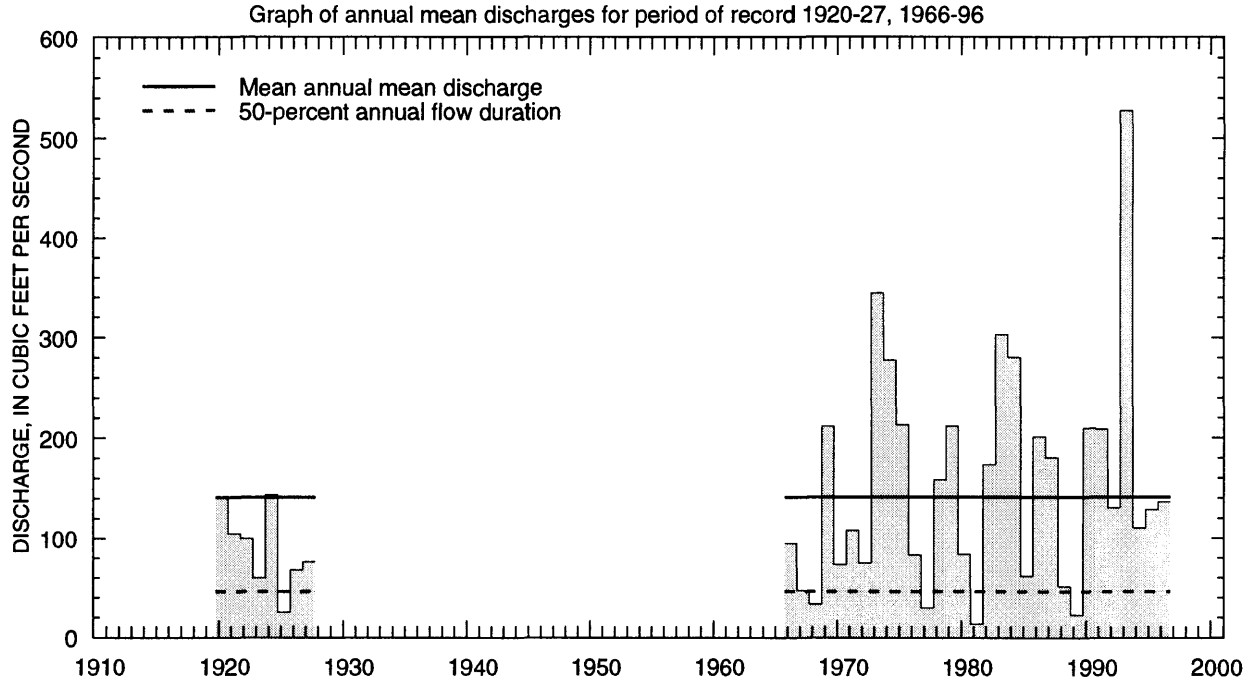
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	13.2	10.0	4,250
2.0	78.4	12.0	5,850
3.0	465	14.0	9,350
4.0	1,110	16.0	13,900
6.0	2,080	18.1	20,000
8.0	3,140		

05470500 SQUAW CREEK AT AMES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1920-27, 1966-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	505	1974	0.36	1989	86.4	119
November	491	1973	0.63	1967	82.2	98.4
December	372	1983	0.001	1977	61.1	73.1
January	275	1973	0.000	1977	41.5	57.5
February	465	1973	0.093	1977	93.4	117
March	777	1979	2.51	1981	214	184
April	773	1991	4.33	1977	213	208
May	817	1990	1.42	1981	228	212
June	1,107	1975	2.97	1977	309	304
July	2,128	1993	3.61	1927	184	351
August	1,177	1993	0.95	1989	93.3	196
September	568	1926	0.071	1971	86.8	139
Annual	528	1993	13.6	1981	141	105

Graph of annual mean discharges for period of record 1920-27, 1966-96



05470500 SQUAW CREEK AT AMES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1920-27, 1966-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.03	0.12	0.00	0.00	0.00	0.56	1.5	0.34	0.11	0.00	0.00	0.00	0.00
95	0.32	0.68	0.27	0.14	0.34	3.4	4.5	2.0	2.7	1.0	0.26	0.05	0.46
90	0.56	2.1	0.86	0.35	1.1	7.6	11	6.5	12	3.0	1.1	0.37	1.7
85	1.1	4.3	3.2	0.73	2.9	22	19	15	22	6.0	2.0	0.86	3.8
80	2.2	8.0	6.2	2.6	6.0	33	31	32	33	10	3.0	1.0	6.6
75	3.8	14	9.5	5.0	7.6	44	46	44	43	15	4.2	2.1	11
70	6.6	20	14	7.0	13	51	55	52	56	20	6.8	3.6	16
60	14	34	24	12	19	72	81	78	84	35	13	8.7	30
50	28	44	38	19	30	102	114	115	134	58	20	15	46
40	51	62	48	28	40	147	163	163	194	84	32	22	70
30	80	83	62	40	62	204	230	234	271	120	49	43	106
25	98	94	71	46	80	250	270	280	333	151	66	59	135
20	121	108	84	55	100	316	323	348	392	198	88	83	178
15	151	134	101	75	146	414	405	423	496	266	120	125	242
10	221	175	136	94	229	536	512	562	732	389	166	236	347
5	338	305	194	150	390	838	730	834	1,230	700	382	413	574

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 50 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	638
0.95	1.05	954
0.90	1.11	1,190
0.80	1.25	1,570
0.50	2	2,700
0.20	5	4,790
0.10	10	6,530
0.04	25	9,170
0.02	50	11,500
0.01	100	14,100
0.005	200	17,000

Magnitude and frequency of annual high discharges, based on period of record 1920-27, 1966-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	258	145	95	63
0.95	1.05	448	268	177	119
0.90	1.11	594	366	242	163
0.80	1.25	827	525	346	236
0.50	2	1,510	993	656	449
0.20	5	2,640	1,760	1,160	801
0.10	10	3,480	2,320	1,530	1,060
0.04	25	4,610	3,050	2,020	1,390
0.02	50	5,500	3,610	2,390	1,650
0.01	100	6,410	4,170	2,770	1,910
0.005	200	7,360	4,730	3,150	2,160

05470500 SQUAW CREEK AT AMES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1920 to March 1927, April 1966 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.20
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.43
0.05	20	0.00	0.00	0.00	0.00	0.05	0.23	0.44	0.94	1.2
0.10	10	0.00	0.00	0.00	0.00	0.22	0.69	1.3	2.0	2.9
0.20	5	0.04	0.07	0.26	0.40	0.79	1.9	3.3	4.7	7.3
0.50	2	1.5	1.8	2.2	2.9	4.8	8.6	14	19	32
0.80	1.25	7.8	8.4	9.0	11	18	28	42	58	98
0.90	1.11	15	15	17	21	30	48	68	95	154
0.96	1.04	24	26	30	35	47	78	108	150	230
0.98	1.02	32	34	42	49	60	104	140	194	285
0.99	1.01	39	43	55	64	73	131	175	239	337

Magnitude and frequency of seasonal low discharges, based on period of record July 1919 to September 1927, July 1965 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.0
0.05	20	0.00	0.00	0.00	0.21	0.35	0.68	1.3	2.8
0.10	10	0.12	0.23	0.33	0.74	1.3	2.3	3.8	6.4
0.20	5	0.78	1.1	1.4	2.4	4.6	7.0	10	16
0.50	2	7.8	8.9	10	14	26	34	44	66
0.80	1.25	30	35	38	52	88	107	128	199
0.90	1.11	49	61	66	92	145	170	199	313
0.96	1.04	70	96	107	156	221	254	295	467
0.98	1.02	84	123	138	211	278	316	367	580
0.99	1.01	95	149	170	271	332	374	437	687
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.16	0.00	0.00	0.06	0.34
0.10	10	0.00	0.04	0.14	0.43	0.12	0.25	0.33	1.1
0.20	5	0.08	0.27	0.52	1.3	0.65	1.2	1.4	3.5
0.50	2	1.9	2.5	3.7	7.7	6.3	9.1	11	18
0.80	1.25	11	14	18	33	30	37	47	63
0.90	1.11	24	30	37	62	58	66	82	106
0.96	1.04	50	63	77	110	103	110	132	171
0.98	1.02	78	99	120	152	141	146	168	223
0.99	1.01	118	146	177	198	182	182	203	276

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IOWA

LOCATION.—Lat 42°00'24", long 93°35'43", in NE1/4 NW1/4 sec. 13, T83N, R24W, Story County, Hydrologic Unit 07080105, on right bank 500 ft downstream from bridge on county highway, 200 ft upstream from bridge on U.S. Highway 30, 0.25 mi downstream from Squaw Creek, 2 mi southeast of Ames, and at mile 222.6 from mouth of Skunk River.

DRAINAGE AREA.—556 mi^2.

PERIOD OF RECORD.—October 1952 to December 1979, October 1991 to September 1996. Prior to October 1966, published as Skunk River below Squaw Creek near Ames.

GAGE.—Water-stage recorder. Datum of gage is 857.10 ft above sea level. Prior to October 1, 1973, at datum 10.00 ft higher. Prior to October 1991, at site 500 ft upstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 26,500 ft^3/s, July 9, 1993; maximum gage height, 25.57 ft, June 27, 1975; no flow many days in 1953-56, 1963-68, 1976-77.

Selected values from rating table number 11, developed October 1993

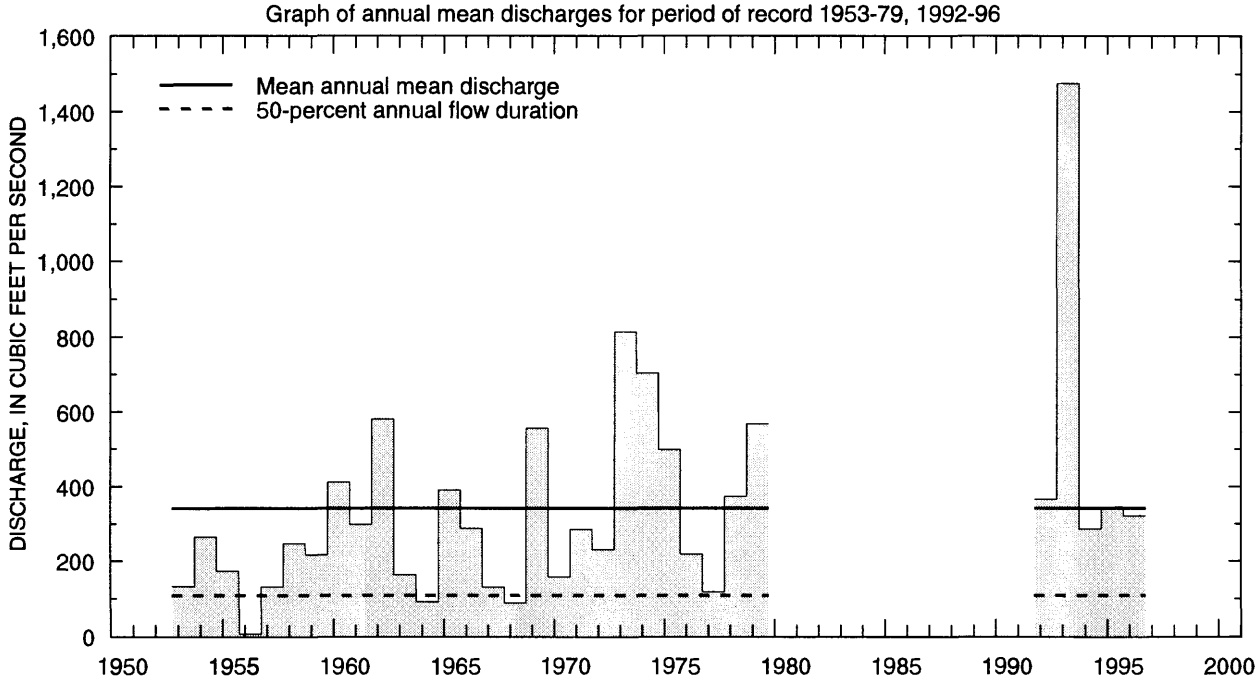
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.6	25.0	14.0	1,240
10.0	67.0	16.0	2,290
10.5	140	18.0	3,610
11.0	236	21.0	6,250
12.0	492	24.0	15,500
13.0	829	25.5	26,000

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-79, 1992-96

Period	Maximum Discharge (ft^3/s)	Maximum Water year of occurrence	Minimum Discharge (ft^3/s)	Minimum Water year of occurrence	Mean Discharge (ft^3/s)	Mean Standard deviation (ft^3/s)
October	1,079	1974	0.000	1957	181	265
November	1,270	1973	0.005	1977	168	248
December	426	1973	0.003	1977	120	140
January	599	1973	0.000	1956	84.8	135
February	919	1973	0.000	1956	169	226
March	2,026	1979	8.71	1956	556	529
April	2,037	1965	3.62	1956	528	519
May	1,421	1974	6.71	1967	506	388
June	2,380	1993	0.000	1977	767	673
July	5,220	1993	0.000	1956	518	965
August	3,921	1993	0.032	1956	314	709
September	1,157	1993	0.16	1976	180	291
Annual	1,475	1993	5.95	1956	342	279

Graph of annual mean discharges for period of record 1953-79, 1992-96



05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-79, 1992-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00	0.00	0.00	0.00	0.00	0.00
95	0.08	0.30	0.00	0.00	0.00	2.1	7.2	5.6	0.41	0.00	2.6	0.70	0.00
90	0.49	0.60	0.10	0.00	0.00	15	13	36	56	29	5.4	1.3	1.1
85	0.70	1.5	0.48	0.00	0.30	21	29	62	103	41	8.5	2.5	3.4
80	1.1	2.6	2.2	0.40	2.2	36	58	105	126	56	11	3.9	8.8
75	1.8	5.1	3.7	2.0	4.4	65	82	137	149	72	14	5.7	17
70	2.8	11	6.2	3.0	12	96	127	173	185	88	19	10	30
60	15	37	22	10	31	138	193	241	262	123	38	24	62
50	36	77	58	33	40	190	273	316	357	168	56	40	108
40	75	133	100	52	78	305	408	399	504	227	85	58	170
30	170	186	147	86	110	501	578	526	699	321	140	89	267
25	241	216	170	103	150	620	679	608	820	400	183	118	330
20	311	263	210	125	220	797	806	733	1,000	515	244	175	429
15	396	314	258	156	300	1,010	953	886	1,330	655	349	259	574
10	506	393	314	219	438	1,390	1,190	1,130	1,920	1,070	538	447	820
5	703	632	401	384	675	2,470	1,750	1,690	2,920	2,180	1,560	920	1,370

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 42 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,490
0.90	1.11	3,000
0.80	1.25	3,750
0.50	2	5,710
0.20	5	8,600
0.10	10	10,600
0.04	25	13,200
0.02	50	15,200
0.01	100	17,200
0.005	200	19,300

Magnitude and frequency of annual high discharges, based on period of record 1953-79, 1992-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	254	138	71	47
0.95	1.05	794	480	290	206
0.90	1.11	1,310	826	530	384
0.80	1.25	2,190	1,440	967	705
0.50	2	4,460	3,060	2,130	1,510
0.20	5	6,750	4,680	3,170	2,120
0.10	10	7,620	5,280	3,500	2,270
0.04	25	8,250	5,690	3,690	2,340
0.02	50	8,510	5,850	3,750	2,360
0.01	100	8,660	5,940	3,780	2,360
0.005	200	8,750	5,990	3,790	2,370

05471000 SOUTH SKUNK RIVER BELOW SQUAW CREEK NEAR AMES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1979, April 1992 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.27
0.10	10	0.00	0.00	0.00	0.00	0.00	0.03	0.22	0.43	1.1
0.20	5	0.00	0.00	0.00	0.00	0.00	0.49	1.6	2.4	4.8
0.50	2	2.8	3.1	3.3	4.0	5.6	10	18	27	48
0.80	1.25	19	20	25	28	44	73	101	148	238
0.90	1.11	34	37	46	51	85	158	211	299	439
0.96	1.04	56	58	68	80	135	302	417	553	722
0.98	1.02	71	73	81	101	168	428	620	775	926
0.99	1.01	86	87	92	119	196	560	862	1,010	1,110

Magnitude and frequency of seasonal low discharges, based on period of record October 1952 to September 1979, October 1991 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.28	3.8
0.10	10	0.00	0.00	0.00	0.00	4.1	5.5	5.7	15
0.20	5	0.00	0.06	0.06	0.52	17	22	23	46
0.50	2	11	11	13	15	83	105	160	193
0.80	1.25	67	71	80	110	224	270	342	478
0.90	1.11	124	142	161	241	325	382	394	660
0.96	1.04	200	251	287	464	440	504	600	848
0.98	1.02	254	342	395	658	513	579	700	957
0.99	1.01	306	438	512	864	576	640	800	1,040
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.00
0.10	10	0.20	0.27	0.32	1.2	0.00	0.00	0.00	0.18
0.20	5	0.97	1.4	1.7	4.0	0.00	0.07	0.43	1.5
0.50	2	7.8	11	14	24	10	11	13	20
0.80	1.25	39	52	63	97	65	98	110	126
0.90	1.11	81	101	120	184	133	209	255	273
0.96	1.04	165	187	215	338	242	373	522	550
0.98	1.02	254	269	299	484	340	498	772	820
0.99	1.01	367	370	394	656	454	616	1,050	1,140

05471050 SOUTH SKUNK RIVER AT COLFAX, IOWA

LOCATION.—Lat 41°40'55", long 93°14'47", in NE1/4 NE1/4 SW1/4 sec. 1, T79N, R21W, Jasper County, Hydrologic Unit 07080105, on left bank 15 ft downstream from bridge on State Highway 117 at north edge of Colfax, 1 mi downstream from Sugar Creek, 2.8 mi upstream from Indian Creek, and at mile 191 from mouth of Skunk River.

DRAINAGE AREA.—803 mi^2.

PERIOD OF RECORD.—October 1985 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 770.00 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 14,200 ft^3/s, July 12, 1993, gage height, 21.53 ft; minimum daily discharge, 1.4 ft^3/s, August 18, 1988.

Selected values from rating table number 6, developed October 1995

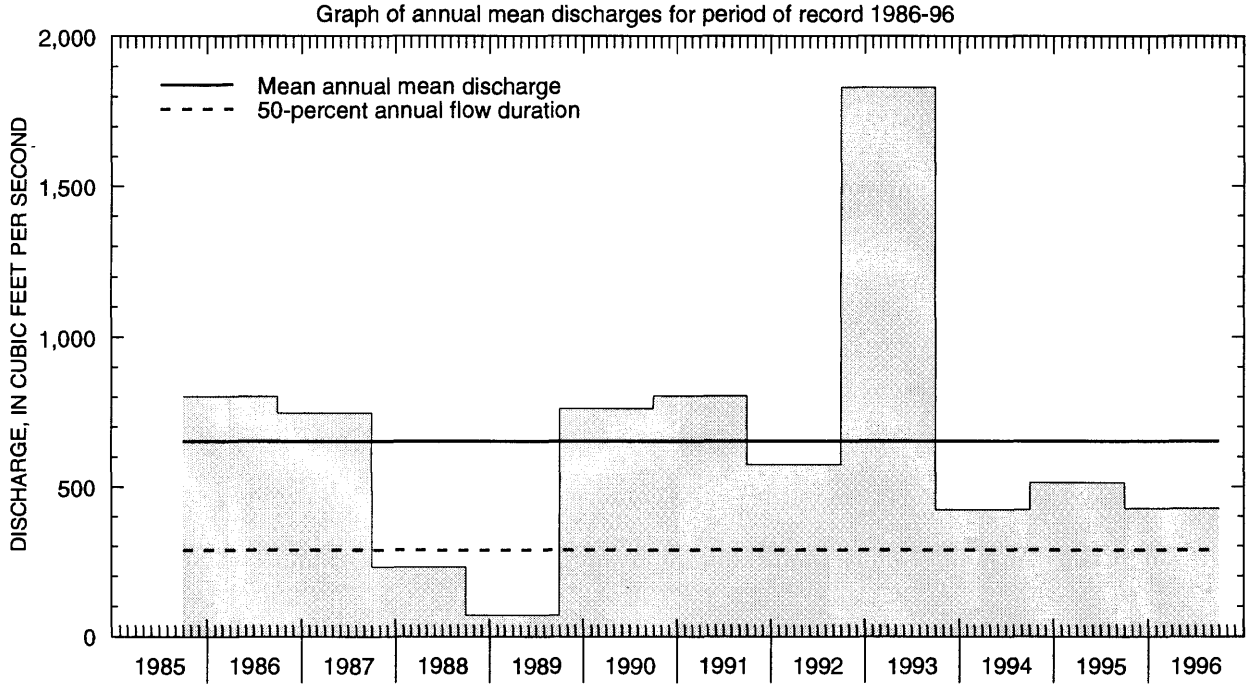
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.7	28.1	10.0	1,140
7.0	57.7	12.0	2,300
7.5	159	14.0	3,740
8.0	301	16.0	5,590
9.0	670	18.5	8,630

05471050 SOUTH SKUNK RIVER AT COLFAX, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1986-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,807	1987	11.9	1989	397	550
November	715	1987	17.5	1989	281	217
December	626	1993	12.4	1989	286	241
January	451	1992	12.3	1989	183	143
February	731	1992	16.2	1990	301	189
March	2,094	1993	168	1989	865	602
April	2,435	1991	62.1	1989	885	789
May	2,481	1991	182	1989	1,115	802
June	3,139	1990	96.7	1988	1,281	1,110
July	5,640	1993	31.8	1988	1,152	1,593
August	3,549	1993	12.6	1988	668	1,023
September	1,911	1993	6.75	1988	390	577
Annual	1,831	1993	69.6	1989	653	459

Graph of annual mean discharges for period of record 1986-96



05471050 SOUTH SKUNK RIVER AT COLFAX, IOWA—Continued

Monthly and annual flow durations, based on period of record 1986-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.7	13	10	7.0	12	13	35	22	47	15	3.4	3.1	7.4
95	12	18	12	8.4	15	83	52	53	87	30	8.6	6.1	15
90	22	28	14	14	17	150	121	167	122	43	21	25	30
85	26	42	17	23	20	210	170	201	147	80	31	35	50
80	40	61	42	35	70	247	211	235	199	136	68	43	80
75	43	79	64	53	100	276	231	298	257	166	87	50	109
70	51	101	100	84	130	349	247	377	297	219	114	60	143
60	84	202	161	117	233	501	337	514	600	339	172	82	215
50	109	250	195	160	260	618	563	841	805	442	226	123	286
40	265	283	310	200	283	765	803	1,130	979	647	287	152	406
30	387	356	426	247	342	952	1,050	1,350	1,170	921	460	189	600
25	527	403	464	280	382	1,030	1,150	1,550	1,420	1,250	597	322	741
20	703	449	498	304	430	1,210	1,420	1,760	1,800	1,650	812	567	940
15	937	541	527	350	499	1,560	1,780	2,070	2,320	2,140	1,180	878	1,170
10	1,150	600	615	400	596	2,110	2,030	2,500	3,380	3,000	1,760	1,310	1,600
5	1,490	745	721	443	875	2,540	2,690	3,470	5,370	5,230	3,540	1,740	2,500

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 11 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	2,550
0.80	1.25	3,410
0.50	2	5,700
0.20	5	9,030
0.10	10	11,200
0.04	25	14,000
0.02	50	16,000
0.01	100	17,900
0.005	200	19,800

Magnitude and frequency of annual high discharges, based on period of record 1986-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	416	296	234	157
0.95	1.05	897	645	488	362
0.90	1.11	1,310	948	706	542
0.80	1.25	2,000	1,470	1,080	850
0.50	2	4,110	3,140	2,270	1,800
0.20	5	7,570	6,040	4,380	3,340
0.10	10	9,990	8,190	5,990	4,380
0.04	25	13,000	11,000	8,160	5,640
0.02	50	15,200	13,100	9,840	6,530
0.01	100	17,300	15,300	11,500	7,350
0.005	200	19,300	17,300	13,300	8,120

05471050 SOUTH SKUNK RIVER AT COLFAX, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1986 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.31	0.63	0.93	1.2	2.1	2.9	3.0	3.0	3.0
0.02	50	0.76	1.3	1.8	2.3	3.6	4.8	5.0	5.6	5.6
0.05	20	2.5	3.5	4.4	5.3	7.5	9.6	11	12	13
0.10	10	6.1	7.7	9.0	11	14	17	19	22	27
0.20	5	15	17	19	22	26	32	37	44	57
0.50	2	56	57	60	66	75	90	110	132	187
0.80	1.25	120	123	130	145	167	206	254	315	458
0.90	1.11	150	159	172	194	232	295	362	456	658
0.96	1.04	174	192	215	245	309	410	497	638	900
0.98	1.02	184	209	239	275	362	494	593	768	1,060
0.99	1.01	190	221	257	299	409	574	681	890	1,210

Magnitude and frequency of seasonal low discharges, based on period of record October 1985 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.7	2.0	2.1	2.8	8.0	8.9	12	26
0.02	50	3.1	3.6	3.8	4.9	12	14	18	35
0.05	20	7.1	8.0	8.5	11	23	26	32	55
0.10	10	14	15	17	20	40	45	53	82
0.20	5	28	32	34	41	74	82	95	136
0.50	2	90	100	108	123	214	243	275	359
0.80	1.25	216	241	260	285	546	633	724	964
0.90	1.11	309	346	371	402	846	995	1,160	1,620
0.96	1.04	422	477	507	544	1,300	1,560	1,870	2,850
0.98	1.02	499	567	600	640	1,690	2,050	2,510	4,100
0.99	1.01	568	650	684	726	2,110	2,580	3,240	5,710
		July-August-September				October-November-December			
0.01	100	0.53	1.7	2.0	3.5	2.8	2.9	3.0	4.0
0.02	50	1.1	2.8	3.3	5.3	4.4	4.7	4.8	6.3
0.05	20	2.9	5.6	6.6	9.6	8.2	9.1	9.5	12
0.10	10	6.6	10	12	16	14	16	17	20
0.20	5	16	21	24	32	26	30	32	37
0.50	2	72	74	87	111	73	85	94	105
0.80	1.25	233	243	284	390	183	207	232	263
0.90	1.11	386	436	509	756	280	309	349	403
0.96	1.04	611	791	926	1,530	424	452	515	611
0.98	1.02	791	1,150	1,340	2,430	544	563	646	785
0.99	1.01	973	1,580	1,860	3,670	672	677	779	969

05471200 INDIAN CREEK NEAR MINGO, IOWA

LOCATION.—Lat 41°48'17", long 93°18'36", in NW1/4 NW1/4 sec. 28, T81N, R21W, Jasper County, Hydrologic Unit 07080105, on right bank 30 ft downstream from bridge on State Highway 117, 0.7 mi downstream from Wolf Creek, 2.2 mi upstream from Byers Branch, 2.9 mi northwest of Mingo, and 11.3 mi upstream from South Skunk River.

DRAINAGE AREA.—276 mi^2.

PERIOD OF RECORD.—May 1958 to September 1975; October 1985 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 810.47 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 23,500 ft^3/s, June 4, 1991, gage height, 19.16 ft; minimum daily discharge, 0.01 ft^3/s, August 18, 1989.

Selected values from rating table number 9, developed October 1994

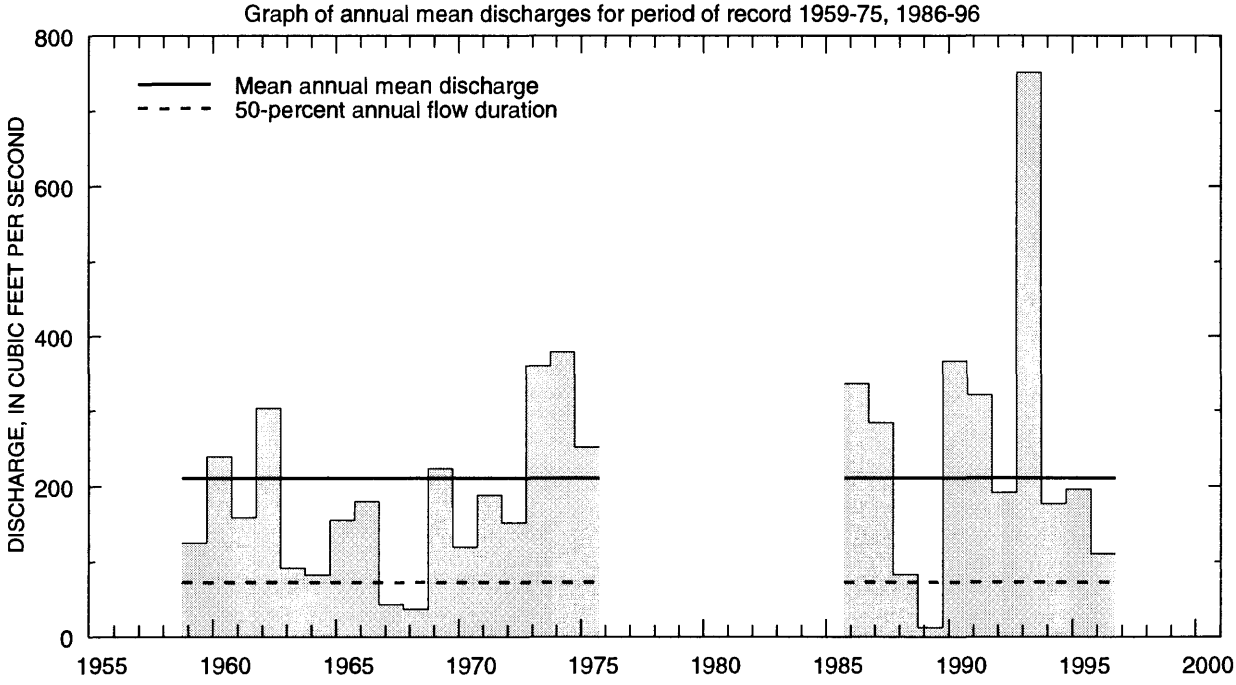
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.6	0.67	8.0	1,070
4.0	22.6	10.0	1,910
4.5	97.2	12.0	2,930
5.0	185	15.0	5,180
6.0	418	19.0	20,000

05471200 INDIAN CREEK NEAR MINGO, IOWA —Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-75, 1986-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	689	1987	1.11	1972	118	185
November	549	1973	4.12	1968	98.3	122
December	319	1973	2.05	1990	80.6	88.2
January	289	1973	1.87	1968	63.1	72.4
February	619	1971	2.25	1967	119	146
March	816	1993	10.9	1968	319	226
April	834	1965	8.07	1989	285	258
May	936	1974	5.58	1967	383	287
June	1,487	1991	10.9	1989	470	428
July	2,809	1993	3.49	1988	329	564
August	1,500	1993	1.44	1988	171	310
September	678	1993	0.91	1988	94.2	171
Annual	751	1993	11.9	1989	211	148

Graph of annual mean discharges for period of record 1959-75, 1986-96



05471200 INDIAN CREEK NEAR MINGO, IOWA —Continued

Monthly and annual flow durations, based on period of record 1959-75, 1986-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.81	2.2	1.4	0.21	1.5	3.0	5.3	4.1	3.6	1.2	0.16	0.41	0.88
95	1.2	4.1	2.0	1.5	2.3	10	7.7	9.9	11	3.6	1.4	0.95	2.3
90	1.7	5.6	3.9	2.5	3.0	17	23	28	37	12	3.8	1.5	4.5
85	4.0	6.3	4.6	3.7	4.0	29	38	67	51	20	5.0	2.2	6.8
80	5.0	8.2	6.2	5.2	6.4	41	54	82	66	31	7.1	3.2	10
75	6.5	12	8.9	6.6	9.0	54	68	94	80	41	9.2	4.5	15
70	8.9	15	11	8.0	15	70	79	115	99	50	12	6.3	22
60	17	33	17	14	41	108	112	160	153	72	20	13	45
50	21	48	43	33	56	164	162	222	222	105	32	18	73
40	39	76	74	61	72	227	227	298	288	145	48	27	110
30	99	106	110	76	97	333	296	390	385	196	81	44	163
25	123	130	125	88	110	386	357	444	487	243	114	60	210
20	180	153	136	98	130	465	415	523	585	324	159	79	268
15	259	189	155	110	155	563	497	644	810	468	253	125	360
10	364	247	193	130	213	701	686	840	1,110	738	425	244	500
5	523	395	240	180	387	1,220	940	1,260	1,820	1,280	875	473	819

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 33 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	771
0.95	1.05	1,270
0.90	1.11	1,640
0.80	1.25	2,240
0.50	2	3,960
0.20	5	6,860
0.10	10	9,070
0.04	25	12,100
0.02	50	14,600
0.01	100	17,100
0.005	200	19,800

Magnitude and frequency of annual high discharges, based on period of record 1959-75, 1986-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	298	172	99	56
0.95	1.05	630	401	252	167
0.90	1.11	901	593	387	270
0.80	1.25	1,340	905	608	441
0.50	2	2,550	1,750	1,200	877
0.20	5	4,260	2,810	1,900	1,310
0.10	10	5,300	3,390	2,250	1,480
0.04	25	6,470	3,960	2,560	1,600
0.02	50	7,220	4,290	2,720	1,650
0.01	100	7,890	4,560	2,850	1,680
0.005	200	8,490	4,770	2,940	1,690

05471200 INDIAN CREEK NEAR MINGO, IOWA —Continued

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1975, April 1986 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.01	0.03	0.05	0.08	0.22	0.40	0.51	0.63	0.73
0.02	50	0.02	0.06	0.10	0.15	0.36	0.62	0.82	1.0	1.2
0.05	20	0.10	0.18	0.25	0.36	0.72	1.2	1.6	2.1	2.6
0.10	10	0.30	0.43	0.55	0.75	1.3	2.1	2.9	3.8	4.8
0.20	5	0.99	1.1	1.4	1.7	2.6	4.0	5.9	7.7	10
0.50	2	5.6	6.0	6.1	7.1	9.4	14	21	28	37
0.80	1.25	20	20	21	24	30	46	69	90	120
0.90	1.11	31	34	37	43	54	86	125	160	213
0.96	1.04	43	55	63	74	97	163	230	287	378
0.98	1.02	50	72	85	104	140	244	337	413	539
0.99	1.01	56	89	109	137	192	350	471	567	731

Magnitude and frequency of seasonal low discharges, based on period of record July 1958 to September 1975, October 1985 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.10	0.12	0.14	0.46	0.90	1.2	1.9	3.1
0.02	50	0.20	0.24	0.29	0.75	1.7	2.2	3.2	5.2
0.05	20	0.55	0.64	0.75	1.5	3.9	5.0	6.7	11
0.10	10	1.3	1.4	1.7	2.8	7.8	9.7	12	20
0.20	5	3.1	3.6	4.1	5.8	16	20	25	38
0.50	2	14	16	18	22	55	64	77	114
0.80	1.25	47	52	58	74	135	157	195	272
0.90	1.11	79	87	96	135	195	227	293	397
0.96	1.04	127	140	155	252	268	314	427	560
0.98	1.02	165	183	203	372	319	374	530	681
0.99	1.01	205	228	253	522	364	429	632	796
		July-August-September				October-November-December			
0.01	100	0.01	0.09	0.17	0.42	0.19	0.25	0.29	0.40
0.02	50	0.03	0.16	0.28	0.62	0.32	0.40	0.48	0.65
0.05	20	0.13	0.37	0.58	1.1	0.68	0.82	0.99	1.3
0.10	10	0.39	0.75	1.1	1.9	1.3	1.5	1.8	2.5
0.20	5	1.3	1.7	2.3	3.8	2.8	3.2	3.9	5.1
0.50	2	7.9	7.9	9.6	14	11	13	15	20
0.80	1.25	31	32	38	56	41	48	56	72
0.90	1.11	53	65	77	117	78	94	107	137
0.96	1.04	84	134	161	262	151	189	211	267
0.98	1.02	107	211	257	444	229	295	323	406
0.99	1.01	128	312	389	716	329	438	471	588

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA

LOCATION.—Lat 41°21'21", long 92°39'24", in NW1/4 SW1/4 sec. 25, T76N, R16W, Mahaska County, Hydrologic Unit 07080105, on left bank downstream from bridge on U.S. Highway 63, 0.3 mi downstream from Painter Creek, 4.0 mi north of Oskaloosa, 52.0 mi upstream from confluence with North Skunk River, and at mile 147.3 upstream from mouth of Skunk River.

DRAINAGE AREA.—1,635 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996. Prior to October 1966, published as Skunk River near Oskaloosa. Prior to October 1948, monthly discharge only, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 685.50 ft above sea level. Prior to May 3, 1995, at site at same datum on right bank 400 ft upstream from bridge; prior to November 21, 1947, nonrecording gage at current site at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,700 ft^3/s, July 15, 1993, gage height, 24.78 ft; minimum daily discharge, 1.8 ft^3/s, October 11–13, 1956.

Selected values from rating table number 9, developed October 1992

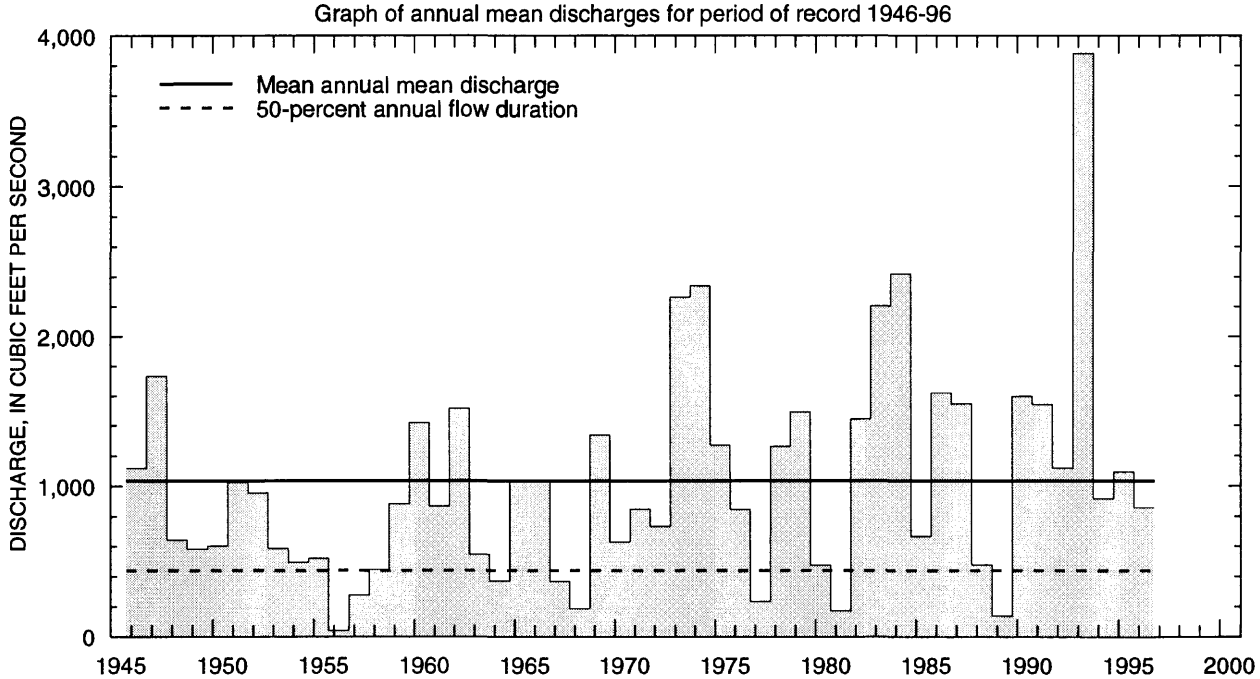
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	16.4	15.0	3,770
7.0	109	18.0	6,150
8.0	365	21.0	9,900
9.0	750	24.0	17,500
10.0	1,200	26.0	26,500
12.0	2,110		

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,646	1987	8.47	1957	515	714
November	3,576	1984	14.5	1957	547	679
December	2,322	1983	7.55	1956	459	540
January	3,906	1973	5.30	1956	468	687
February	3,587	1973	42.9	1954	814	790
March	4,841	1979	45.9	1954	1,632	1,157
April	5,366	1983	42.1	1956	1,626	1,491
May	6,168	1974	74.2	1956	1,679	1,422
June	9,222	1947	39.4	1977	2,067	1,949
July	11,770	1993	27.3	1977	1,413	1,872
August	7,772	1993	43.3	1988	677	1,150
September	5,140	1993	27.8	1956	494	811
Annual	3,884	1993	40.1	1956	1,033	716

Graph of annual mean discharges for period of record 1946-96



05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	9.3	15	6.8	4.8	6.9	30	39	59	30	15	24	13	9.4
95	25	30	14	7.7	27	63	78	88	87	69	43	29	31
90	41	45	24	19	41	108	120	141	188	132	68	48	54
85	51	55	38	30	66	160	227	238	263	196	89	63	74
80	56	62	47	43	87	261	343	353	365	244	108	72	100
75	61	75	60	74	110	400	458	450	448	302	130	87	133
70	72	100	81	92	150	496	527	547	551	354	154	105	173
60	105	161	140	140	220	746	690	808	791	527	205	137	280
50	179	288	240	210	300	1,000	954	1,070	1,180	712	277	188	440
40	250	440	340	280	520	1,310	1,300	1,370	1,590	912	368	257	650
30	502	620	480	450	720	1,810	1,720	1,840	2,090	1,180	494	363	949
25	634	714	621	540	840	2,150	2,000	2,190	2,560	1,370	571	436	1,150
20	843	817	768	640	1,080	2,530	2,370	2,530	3,100	1,700	692	528	1,440
15	1,060	1,010	1,000	770	1,500	3,080	2,900	3,070	4,190	2,250	918	686	1,900
10	1,370	1,350	1,200	1,000	2,140	4,000	3,740	4,050	5,490	3,300	1,380	997	2,570
5	2,160	1,990	1,560	1,610	3,360	5,820	5,830	5,950	7,480	5,840	2,610	2,020	4,250

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 53 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	3,610
0.90	1.11	4,400
0.80	1.25	5,550
0.50	2	8,520
0.20	5	12,800
0.10	10	15,700
0.04	25	19,300
0.02	50	22,100
0.01	100	24,800
0.005	200	27,500

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	500	416	287	184
0.95	1.05	1,640	1,280	889	612
0.90	1.11	2,720	2,090	1,460	1,040
0.80	1.25	4,480	3,430	2,440	1,770
0.50	2	8,430	6,720	4,970	3,710
0.20	5	11,300	9,700	7,540	5,640
0.10	10	12,100	10,700	8,540	6,360
0.04	25	12,400	11,400	9,270	6,860
0.02	50	12,500	11,700	9,570	7,060
0.01	100	12,600	11,800	9,760	7,180
0.005	200	12,600	11,900	9,870	7,240

05471500 SOUTH SKUNK RIVER NEAR OSKALOOSA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.9	1.9	2.0	2.5	3.1	4.4	6.2	7.2	12
0.02	50	3.1	3.1	3.3	4.0	4.9	6.8	9.5	11	18
0.05	20	6.3	6.4	6.7	7.8	9.4	13	18	20	32
0.10	10	11	12	12	14	16	22	30	34	51
0.20	5	22	22	24	26	30	40	54	63	89
0.50	2	64	67	71	75	89	117	154	184	243
0.80	1.25	156	162	173	187	227	304	395	486	624
0.90	1.11	230	240	256	282	352	478	618	777	993
0.96	1.04	331	344	369	419	540	751	965	1,250	1,600
0.98	1.02	408	422	454	528	698	988	1,260	1,660	2,150
0.99	1.01	484	499	538	640	868	1,250	1,590	2,140	2,780

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.3	2.4	2.6	3.9	15	18	21	28
0.02	50	3.8	4.0	4.3	6.5	23	28	33	43
0.05	20	7.9	8.3	8.9	13	43	51	59	77
0.10	10	15	16	17	25	72	84	97	127
0.20	5	29	32	34	51	129	150	172	226
0.50	2	99	110	118	173	348	402	459	611
0.80	1.25	291	330	360	504	793	932	1,070	1,450
0.90	1.11	481	555	612	830	1,150	1,370	1,570	2,180
0.96	1.04	791	927	1,040	1,350	1,630	1,980	2,300	3,240
0.98	1.02	1,070	1,260	1,420	1,810	2,000	2,470	2,880	4,100
0.99	1.01	1,380	1,650	1,870	2,320	2,370	2,970	3,480	5,020
		July-August-September				October-November-December			
0.01	100	5.6	8.9	12	19	2.3	2.5	3.2	5.1
0.02	50	8.2	12	15	24	3.8	4.1	5.2	7.8
0.05	20	14	19	23	33	7.8	8.7	10	15
0.10	10	23	28	32	45	14	16	19	25
0.20	5	39	44	50	66	29	32	37	47
0.50	2	100	107	120	152	94	106	120	148
0.80	1.25	232	253	291	390	264	294	343	431
0.90	1.11	345	393	469	666	424	469	565	731
0.96	1.04	512	625	786	1,220	671	735	926	1,260
0.98	1.02	650	841	1,100	1,830	882	959	1,250	1,760
0.99	1.01	797	1,090	1,500	2,680	1,110	1,200	1,610	2,370

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IOWA

LOCATION.—Lat 41°18'03", long 92°12'16", in NE1/4 SE1/4 sec. 14, T75N, R12W, Keokuk County, Hydrologic Unit 07080106, on right bank 10 ft downstream from bridge on State Highway 149, 1.2 mi downstream from Cedar Creek, 2.2 mi south of Sigourney, 4.0 mi upstream from Bridge Creek, and 16.2 mi upstream from confluence with South Skunk River.

DRAINAGE AREA.—730 mi^2.

PERIOD OF RECORD.—October 1945 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 651.53 ft above sea level. Prior to June 10, 1953, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 27,500 ft^3/s, March 31, 1960, gage height, 25.33 ft; minimum daily discharge, 0.10 ft^3/s, October 7–November 15, 1956.

Selected values from rating table number 10, developed October 1992

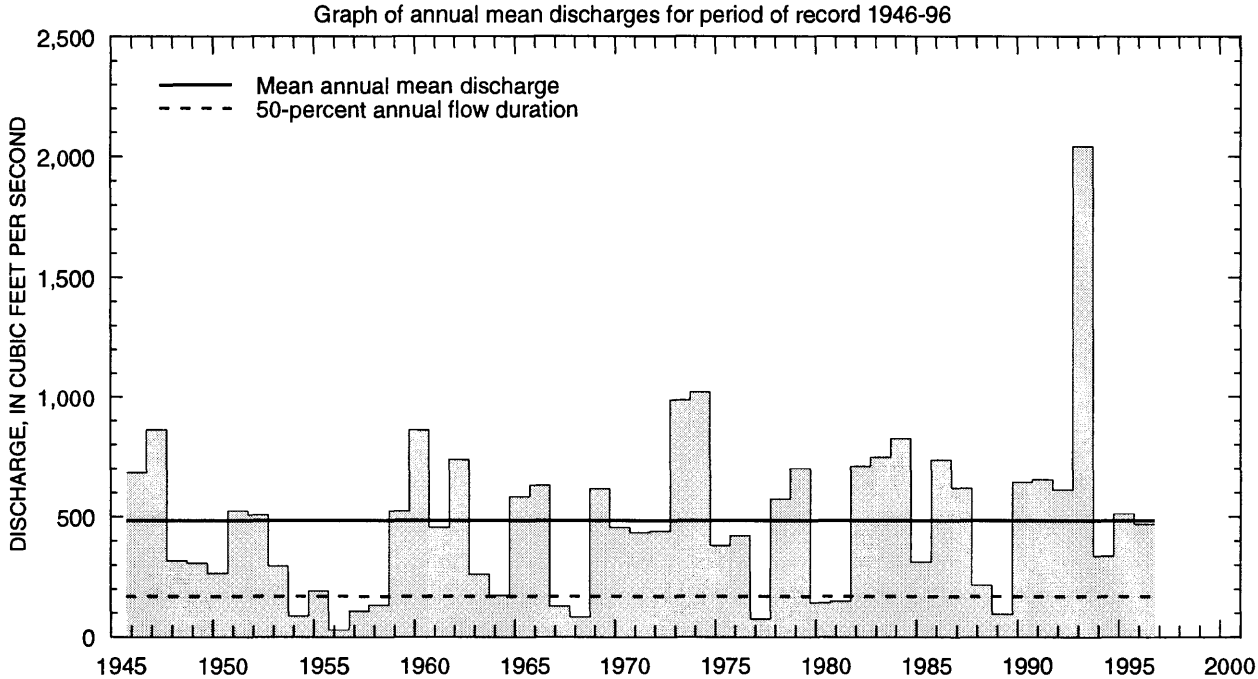
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	3.00	12.0	2,190
4.0	73.0	15.0	3,420
5.0	214	18.0	5,400
6.0	399	21.0	9,000
9.0	1,160	25.0	18,200

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,603	1987	0.13	1957	215	314
November	1,890	1962	3.38	1957	292	387
December	1,208	1983	2.58	1956	235	269
January	1,767	1946	2.26	1954	266	390
February	1,311	1973	12.8	1954	411	318
March	2,996	1979	17.0	1954	858	684
April	2,826	1993	11.2	1956	779	729
May	4,170	1974	14.4	1956	814	857
June	4,145	1947	20.1	1977	768	815
July	5,098	1993	11.2	1977	561	830
August	3,668	1993	7.90	1955	301	560
September	2,708	1993	4.35	1956	300	533
Annual	2,041	1993	27.7	1956	483	342

Graph of annual mean discharges for period of record 1946-96



05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.69	2.5	2.1	3.3	12	9.2	10	10	6.3	6.8	0.80	2.5
95	4.8	6.0	4.0	2.7	10	32	32	34	33	18	13	6.8	9.8
90	9.8	12	9.5	12	19	58	76	67	54	31	19	10	18
85	13	18	13	16	32	87	112	96	69	49	26	16	27
80	17	25	18	21	45	128	142	121	86	66	34	22	39
75	21	32	28	28	64	176	178	145	109	82	43	27	52
70	27	40	36	37	80	210	213	179	143	100	50	34	68
60	42	67	64	63	120	300	280	275	236	140	67	47	106
50	62	110	96	100	185	412	400	397	340	187	87	65	168
40	91	164	172	150	263	542	555	535	496	257	118	85	252
30	183	270	246	210	369	780	725	731	728	377	153	122	382
25	239	350	302	255	420	981	834	893	884	480	195	177	477
20	298	434	386	310	520	1,220	1,040	1,090	1,130	601	258	241	600
15	392	546	470	380	700	1,610	1,270	1,410	1,490	804	351	365	798
10	572	686	612	500	1,000	2,220	1,790	2,080	2,000	1,350	537	613	1,180
5	910	1,080	780	839	1,800	3,340	2,980	3,280	2,810	2,390	1,270	1,380	2,100

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 51 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	764
0.95	1.05	1,500
0.90	1.11	2,100
0.80	1.25	3,080
0.50	2	6,060
0.20	5	11,000
0.10	10	14,600
0.04	25	19,200
0.02	50	22,800
0.01	100	26,300
0.005	200	29,800

Magnitude and frequency of annual high discharges, based on period of record 1946-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	443	301	181	122
0.95	1.05	1,010	714	458	313
0.90	1.11	1,490	1,070	705	486
0.80	1.25	2,310	1,680	1,130	781
0.50	2	4,690	3,430	2,350	1,650
0.20	5	8,240	5,940	4,030	2,850
0.10	10	10,500	7,440	4,990	3,540
0.04	25	13,000	9,080	5,990	4,270
0.02	50	14,700	10,100	6,590	4,710
0.01	100	16,200	11,000	7,080	5,070
0.005	200	17,600	11,800	7,490	5,370

05472500 NORTH SKUNK RIVER NEAR SIGOURNEY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.20	0.21	0.23	0.24	0.28	0.54	1.6	1.7	4.0
0.02	50	0.41	0.44	0.49	0.51	0.62	1.1	2.6	2.9	6.3
0.05	20	1.2	1.2	1.4	1.5	1.8	2.9	5.6	6.3	12
0.10	10	2.6	2.8	3.1	3.4	4.3	6.3	10	12	21
0.20	5	6.2	6.6	7.3	8.1	10	14	21	24	39
0.50	2	23	25	27	30	39	53	68	82	116
0.80	1.25	58	60	64	72	92	138	185	235	304
0.90	1.11	82	84	87	98	124	200	292	380	479
0.96	1.04	107	109	111	124	154	273	450	604	750
0.98	1.02	123	123	124	139	171	321	579	794	983
0.99	1.01	135	135	140	150	183	362	716	1,000	1,240

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.71	0.81	0.89	1.4	3.9	5.4	7.1	9.2
0.02	50	1.3	1.4	1.6	2.6	6.3	8.3	11	14
0.05	20	2.9	3.2	3.6	6.1	12	15	19	26
0.10	10	5.7	6.3	7.1	12	21	26	32	45
0.20	5	12	13	15	26	39	46	57	81
0.50	2	45	49	55	92	108	128	155	231
0.80	1.25	132	147	162	254	254	308	376	574
0.90	1.11	216	242	263	394	371	463	571	879
0.96	1.04	344	390	417	590	530	688	864	1,330
0.98	1.02	452	517	546	741	651	871	1,110	1,710
0.99	1.01	567	654	681	890	772	1,060	1,370	2,120
		July-August-September				October-November-December			
0.01	100	0.64	0.95	1.2	3.6	0.25	0.27	0.27	0.29
0.02	50	1.1	1.5	1.9	4.9	0.54	0.58	0.60	0.68
0.05	20	2.3	3.0	3.7	7.8	1.6	1.7	1.8	2.2
0.10	10	4.3	5.4	6.6	12	3.6	4.1	4.3	5.5
0.20	5	8.8	10	13	20	9.0	10	11	15
0.50	2	29	33	40	53	37	43	48	68
0.80	1.25	77	90	108	149	103	116	142	198
0.90	1.11	120	143	173	259	152	170	216	296
0.96	1.04	182	226	274	471	211	233	310	412
0.98	1.02	232	297	362	696	249	273	372	486
0.99	1.01	283	375	458	993	282	306	428	548

05473000 SKUNK RIVER AT COPPOCK, IOWA

LOCATION.—Lat 41°09'38", long 91°43'09", in NE1/4 NW1/4 sec. 1, T73N, R8W, Jefferson County, Hydrologic Unit 07080107, at bridge on State Highway 78, 1/2 mi west of Coppock and 3/4 mi upstream from Crooked Creek.

DRAINAGE AREA.—2,916 mi^2.

PERIOD OF RECORD.—October 1913 to September 1944 (discontinued).

GAGE.—Wire weight gage. Datum of gage is 595 ft above sea level, from topographic map.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 41,500 ft^3/s, May 24, 1944, gage height, 22.27 ft; minimum daily discharge, 8.0 ft^3/s, January 27, 28, 1940.

Selected values from rating table number 16, developed May 1944
(A discharge measurement to validate this rating has not been made since September 1944)

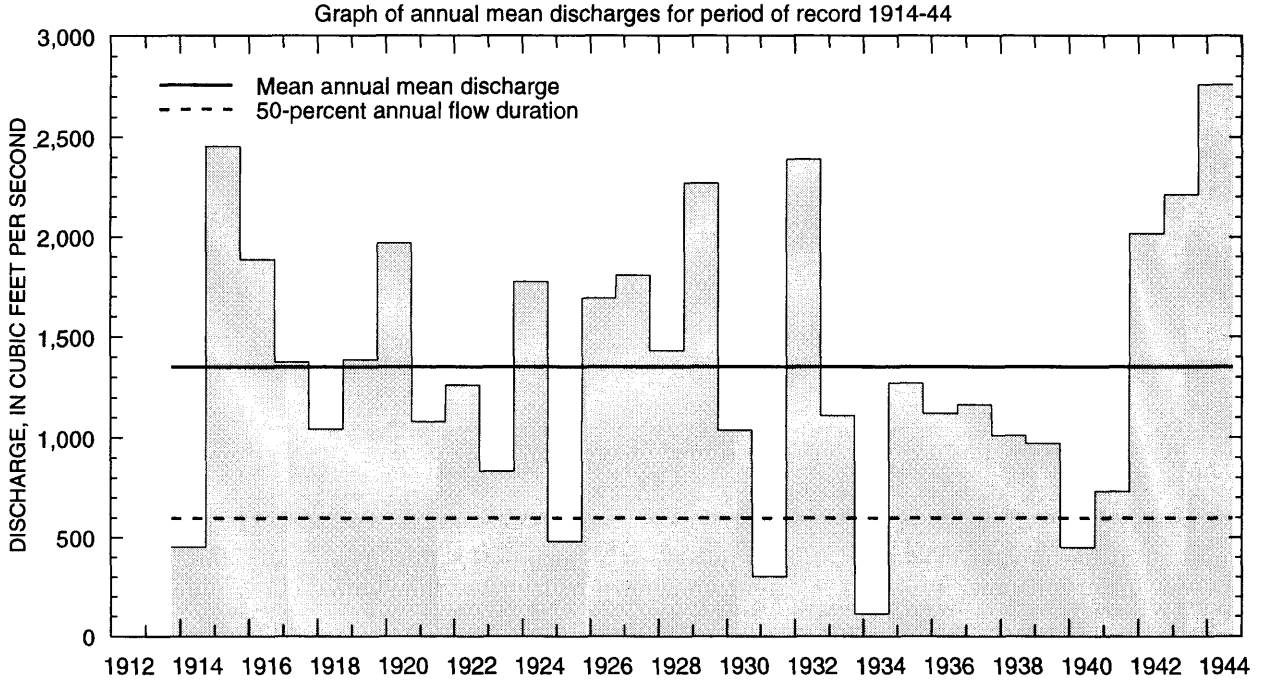
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	100	10.0	4,350
4.0	261	14.0	8,910
4.5	492	16.0	13,400
5.0	810	18.0	20,300
6.0	1,510	22.0	39,900
7.0	2,210		

05473000 SKUNK RIVER AT COPPOCK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1914-44

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4,638	1916	58.0	1938	870	1,150
November	4,071	1932	45.4	1938	904	1,154
December	4,395	1932	34.6	1938	645	878
January	4,876	1932	14.0	1940	648	949
February	4,383	1915	31.0	1940	1,290	982
March	7,583	1929	159	1934	2,315	1,819
April	5,657	1944	140	1934	1,745	1,433
May	10,430	1944	67.8	1934	2,049	2,025
June	8,031	1917	44.2	1934	2,429	2,123
July	3,738	1915	96.3	1940	1,187	1,030
August	7,126	1943	23.0	1934	1,056	1,497
September	9,527	1926	41.1	1934	1,080	1,854
Annual	2,761	1944	111	1934	1,350	680

Graph of annual mean discharges for period of record 1914-44



05473000 SKUNK RIVER AT COPPOCK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1914-44

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	38	36	20	10	16	130	105	62	33	51	19	32	22
95	60	58	40	20	50	184	258	202	175	99	50	67	65
90	77	75	68	50	120	380	365	263	292	158	87	85	100
85	95	90	80	100	170	454	465	318	376	203	128	96	146
80	109	114	100	125	230	560	581	428	503	248	160	114	191
75	125	158	123	150	300	704	717	543	584	289	188	134	241
70	157	201	150	180	350	818	816	655	680	340	215	157	300
60	215	356	230	210	450	1,000	979	837	995	464	294	255	434
50	344	447	295	320	650	1,390	1,150	1,150	1,330	672	362	364	596
40	488	543	400	421	898	1,810	1,360	1,580	1,700	924	493	532	870
30	719	699	528	500	1,300	2,420	1,640	2,120	2,340	1,210	824	719	1,210
25	924	838	686	540	1,560	2,730	1,950	2,490	2,880	1,450	1,040	838	1,500
20	1,220	1,090	900	625	2,000	3,420	2,420	3,040	3,490	1,720	1,330	1,050	1,840
15	1,610	1,450	1,100	866	2,500	4,190	3,200	3,710	4,180	2,050	1,740	1,460	2,420
10	2,260	2,050	1,500	1,290	3,200	5,470	4,060	4,680	6,010	2,760	2,420	2,480	3,360
5	3,510	3,680	2,720	3,000	5,000	8,370	5,400	6,600	8,810	4,420	3,700	5,740	5,300

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 45 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	4,080
0.90	1.11	5,340
0.80	1.25	7,300
0.50	2	12,800
0.20	5	21,500
0.10	10	27,700
0.04	25	35,900
0.02	50	42,100
0.01	100	48,300
0.005	200	54,700

Magnitude and frequency of annual high discharges, based on period of record 1914-44

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,080	729	441	316
0.95	1.05	2,400	1,830	1,260	926
0.90	1.11	3,510	2,800	2,030	1,490
0.80	1.25	5,340	4,420	3,320	2,450
0.50	2	10,600	8,870	6,810	4,970
0.20	5	18,000	14,500	10,800	7,640
0.10	10	22,600	17,500	12,600	8,760
0.04	25	27,800	20,300	14,000	9,630
0.02	50	31,100	22,000	14,800	10,000
0.01	100	34,100	23,200	15,200	10,300
0.005	200	36,700	24,200	15,600	10,400

05473000 SKUNK RIVER AT COPPOCK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1914 to March 1944

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	5.5	5.6	5.8	6.5	7.3	14	20	24	46
0.02	50	8.0	8.2	8.5	9.6	11	21	28	34	60
0.05	20	13	14	15	17	19	35	47	57	90
0.10	10	21	22	23	26	31	54	72	87	128
0.20	5	34	36	39	44	53	89	118	142	194
0.50	2	82	85	92	105	131	203	274	333	423
0.80	1.25	173	179	193	217	279	401	563	701	897
0.90	1.11	244	252	270	300	392	543	784	994	1,310
0.96	1.04	342	352	372	408	542	721	1,080	1,400	1,960
0.98	1.02	418	429	449	489	655	850	1,310	1,720	2,530
0.99	1.01	496	507	525	567	766	972	1,530	2,050	3,170

Magnitude and frequency of seasonal low discharges, based on period of record October 1913 to September 1944

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	6.5	7.1	7.1	12	31	35	42	50
0.02	50	10	11	12	19	47	53	63	75
0.05	20	20	21	24	37	83	95	109	131
0.10	10	34	36	42	64	129	149	171	208
0.20	5	61	66	78	116	208	243	276	348
0.50	2	166	178	213	316	433	509	581	809
0.80	1.25	374	404	467	703	722	851	995	1,590
0.90	1.11	534	581	649	993	875	1,030	1,230	2,120
0.96	1.04	745	816	869	1,370	1,020	1,200	1,460	2,760
0.98	1.02	900	992	1,020	1,630	1,100	1,290	1,590	3,200
0.99	1.01	1,050	1,160	1,300	1,890	1,170	1,360	1,700	3,610
		July-August-September				October-November-December			
0.01	100	18	20	22	22	8.0	9.0	12	20
0.02	50	23	25	27	30	11	13	17	27
0.05	20	32	35	38	45	19	22	28	42
0.10	10	43	47	52	66	30	35	43	62
0.20	5	62	69	77	103	52	60	71	99
0.50	2	130	148	169	246	137	160	179	235
0.80	1.25	282	326	388	583	343	390	428	553
0.90	1.11	428	502	609	914	542	605	661	859
0.96	1.04	676	803	1,000	1,480	869	945	1,040	1,370
0.98	1.02	915	1,100	1,390	2,010	1,170	1,250	1,370	1,840
0.99	1.01	1,200	1,450	1,880	2,650	1,520	1,590	1,760	2,400

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IOWA

LOCATION.—Lat 40°55'20", long 91°40'10", in SE1/4 NW 1/4 sec. 28, T71N, R7W, Henry County, Hydrologic Unit 070801027, on left bank 30 ft upstream from bridge on County Highway H46, 3.0 mi west of Oakland Mills, 2.9 mi upstream from Wolf Creek, and 4.3 mi upstream from mouth.

DRAINAGE AREA.—530 mi^2.

PERIOD OF RECORD.—Occasional low flow measurements, water years 1957 to 1977. July 1977 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 565.07 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,300 ft^3/s, May 28, 1996; maximum gage height, 21.27 ft, July 9, 1993; minimum daily discharge, 0.42 ft^3/s, September 17, 1988.

Selected values from rating table number 5, developed May 1996

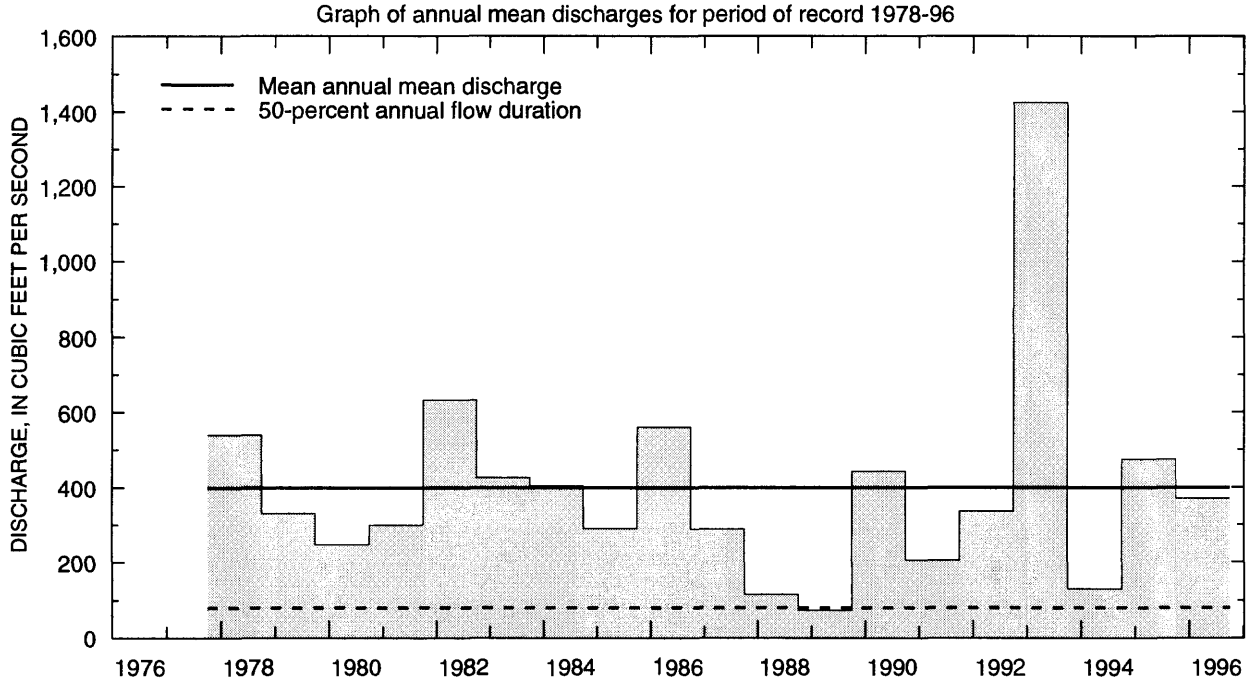
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	0.42	10.0	2,030
3.0	16.4	12.0	2,920
4.0	156	15.0	4,570
6.0	655	18.0	6,750
8.0	1,290	21.0	12,200

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1978-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,711	1987	5.93	1989	228	416
November	1,340	1993	10.2	1990	327	381
December	1,364	1983	4.43	1990	276	331
January	545	1993	9.82	1989	88.6	117
February	1,091	1985	6.36	1989	292	299
March	1,987	1979	32.3	1989	629	588
April	1,863	1983	37.7	1989	615	552
May	3,116	1996	33.3	1988	727	864
June	2,199	1990	14.6	1988	498	584
July	4,565	1993	3.52	1988	630	1,072
August	2,186	1993	5.35	1983	217	491
September	1,245	1986	6.28	1991	257	352
Annual	1,424	1993	73.0	1989	399	291

Graph of annual mean discharges for period of record 1978-96



05473400 CEDAR CREEK NEAR OAKLAND MILLS, IOWA—Continued

Monthly and annual flow durations, based on period of record 1978-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.86	3.0	3.3	6.7	4.5	11	5.8	14	7.0	2.0	0.74	0.67	2.0
95	2.0	7.6	4.5	9.7	12	40	38	28	15	4.6	2.8	2.0	4.9
90	3.1	13	8.0	16	19	53	53	41	19	8.8	4.5	3.3	8.8
85	4.5	21	19	22	27	76	67	47	25	12	6.7	4.3	14
80	7.0	31	32	28	33	90	78	56	34	15	8.6	5.5	19
75	8.8	37	44	32	40	108	91	70	44	19	10	6.3	28
70	11	42	55	35	49	123	109	88	56	25	12	7.7	37
60	16	55	72	42	58	157	151	123	96	40	18	11	55
50	31	84	95	53	74	200	224	157	148	62	26	15	80
40	52	119	120	62	120	290	313	227	207	95	39	26	123
30	74	157	174	75	188	472	460	342	331	195	59	60	195
25	92	200	215	88	262	608	533	470	411	326	80	92	258
20	132	266	256	100	352	860	709	669	523	592	108	156	361
15	206	380	326	130	500	1,180	943	1,060	783	1,100	184	242	530
10	467	634	493	175	702	1,900	1,460	2,010	1,130	2,390	442	612	936
5	1,100	1,660	1,090	360	1,270	2,930	2,930	4,210	2,190	3,990	1,200	1,480	2,080

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 18 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,710
0.95	1.05	3,580
0.90	1.11	4,120
0.80	1.25	4,840
0.50	2	6,470
0.20	5	8,410
0.10	10	9,540
0.04	25	10,800
0.02	50	11,700
0.01	100	12,500
0.005	200	13,300

Magnitude and frequency of annual high discharges, based on period of record 1978-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,450	741	373	261
0.95	1.05	2,230	1,230	681	457
0.90	1.11	2,760	1,590	912	606
0.80	1.25	3,500	2,110	1,270	837
0.50	2	5,220	3,460	2,210	1,480
0.20	5	7,300	5,290	3,520	2,470
0.10	10	8,490	6,450	4,340	3,150
0.04	25	9,790	7,810	5,300	4,010
0.02	50	10,600	8,750	5,950	4,640
0.01	100	11,400	9,630	6,550	5,270
0.005	200	12,100	10,500	7,100	5,890

05473400 CEDAR CREEK NEAR OAKLAND MILLS, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1978 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.26	0.31	0.38	0.49	1.2	1.8	2.0	2.7	6.5
0.02	50	0.38	0.45	0.55	0.70	1.6	2.5	2.9	3.9	9.4
0.05	20	0.66	0.76	0.93	1.1	2.3	3.9	4.9	6.6	16
0.10	10	1.0	1.2	1.4	1.8	3.3	5.8	7.8	11	25
0.20	5	1.8	2.0	2.4	2.9	4.9	9.3	13	18	42
0.50	2	4.4	4.9	5.8	7.1	11	23	37	52	103
0.80	1.25	10	11	13	16	25	54	97	144	232
0.90	1.11	15	16	18	24	37	84	156	242	340
0.96	1.04	22	23	26	36	59	135	257	416	498
0.98	1.02	27	30	32	46	79	182	351	588	627
0.99	1.01	33	36	38	57	103	238	463	765	799

Magnitude and frequency of seasonal low discharges, based on period of record July 1977 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.3	2.8	3.5	6.4	2.3	2.7	3.2	9.5
0.02	50	3.3	4.0	4.9	8.0	3.3	4.0	4.7	12
0.05	20	5.4	6.5	7.8	11	5.5	6.8	8.1	19
0.10	10	8.1	9.7	12	15	8.5	11	13	27
0.20	5	13	15	18	22	14	18	22	42
0.50	2	29	33	37	45	34	45	58	101
0.80	1.25	56	61	68	94	77	101	135	249
0.90	1.11	76	81	89	138	114	148	202	403
0.96	1.04	102	106	113	207	169	215	301	677
0.98	1.02	121	123	131	271	215	270	384	951
0.99	1.01	139	140	147	344	265	327	472	1,290
		July-August-September				October-November-December			
0.01	100	0.47	0.81	1.3	2.4	0.30	0.33	0.40	0.93
0.02	50	0.57	0.95	1.4	2.7	0.46	0.52	0.63	1.5
0.05	20	0.78	1.3	1.7	3.5	0.87	1.0	1.2	2.9
0.10	10	1.1	1.7	2.1	4.6	1.5	1.8	2.2	5.2
0.20	5	1.6	2.5	3.0	6.7	2.9	3.5	4.3	9.9
0.50	2	4.2	6.1	7.5	17	9.7	12	15	32
0.80	1.25	13	19	27	55	30	38	51	88
0.90	1.11	26	36	63	117	54	67	95	143
0.96	1.04	57	79	179	286	99	121	180	232
0.98	1.02	98	136	376	540	144	174	269	311
0.99	1.01	164	229	777	992	202	239	384	400

05473500 BIG CREEK NEAR MOUNT PLEASANT, IOWA

LOCATION.—Lat 41°00'52", long 91°34'49", in NW1/4 NW1/4 sec. 29, T72N, R6W, Henry County, Hydrologic Unit 07080107, on left bank 12 ft downstream from bridge on county highway, 100 ft downstream from Lynn Creek, 0.7 mi downstream from Brandywine Creek and 3.7 mi northwest of Court House at Mount Pleasant.

DRAINAGE AREA.—106 mi^2.

PERIOD OF RECORD.—October 1955 to October 1979 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 630.53 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,500 ft^3/s, April 22, 1973, gage height, 25.58 ft; no flow at times throughout period of record.

Selected values from rating table number 9, developed March 1973
A discharge measurement to validate this rating has not been made since September 1979.

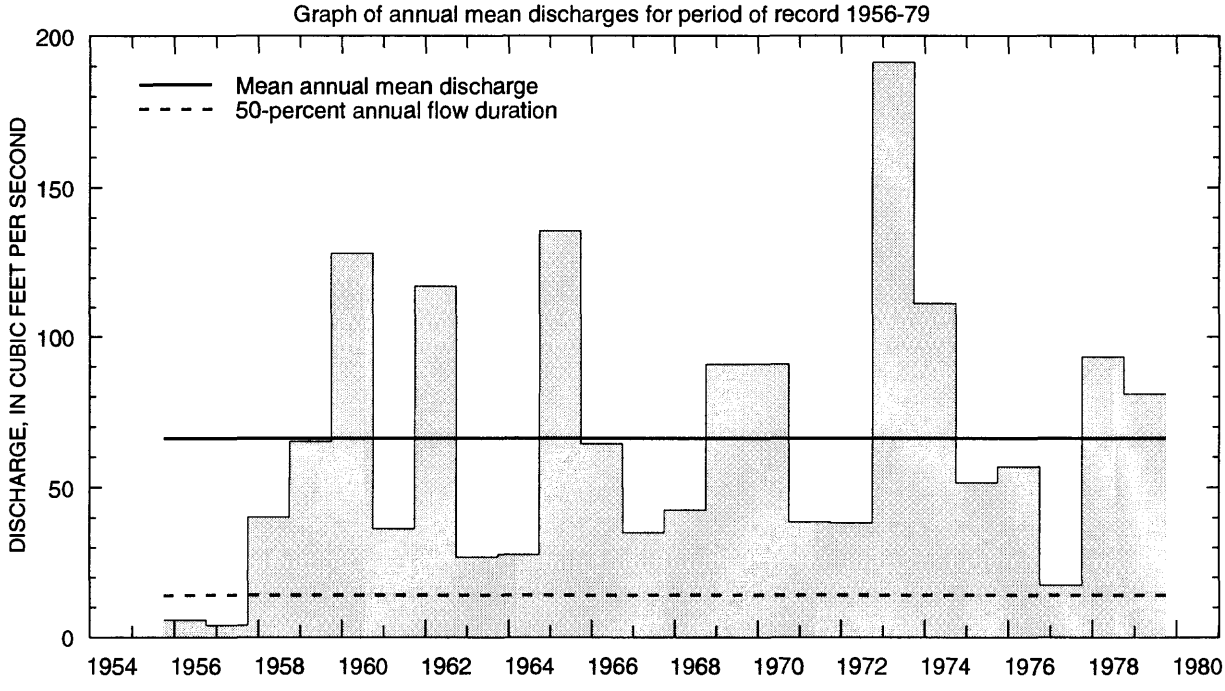
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.2	7.6	6.0	690
2.4	20	8.0	1240
2.8	67	12.0	2730
3.0	98	18.0	5750
3.5	184	24.0	9390
4.5	366		

05473500 BIG CREEK NEAR MOUNT PLEASANT, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1956-79

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	206	1974	0.000	1957	38.4	62.0
November	283	1962	0.000	1956	36.4	68.0
December	100	1966	0.000	1956	31.9	31.7
January	232	1974	0.000	1956	41.7	63.4
February	229	1959	2.45	1957	57.2	59.9
March	593	1979	0.54	1956	136	141
April	767	1973	0.33	1956	127	155
May	399	1973	0.38	1956	87.9	96.5
June	312	1960	1.77	1961	70.6	73.7
July	359	1969	0.23	1957	52.9	78.1
August	214	1970	0.090	1966	33.3	56.6
September	854	1965	0.000	1956	82.3	198
Annual	191	1973	3.89	1957	66.2	46.2

Graph of annual mean discharges for period of record 1956-79



05473500 BIG CREEK NEAR MOUNT PLEASANT, IOWA—Continued

Monthly and annual flow durations, based on period of record 1956-79

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.20	0.20	4.8	2.5	0.49	0.04	0.00	0.00	0.00
90	0.00	0.00	0.10	0.01	1.6	5.0	12	7.6	1.2	0.40	0.00	0.00	0.10
85	0.00	0.33	0.20	0.30	3.4	8.0	16	11	3.9	1.1	0.06	0.00	0.42
80	0.10	0.50	0.35	0.80	4.5	11	19	14	5.7	1.9	0.16	0.00	1.1
75	0.20	1.1	0.50	2.2	6.2	15	23	17	8.2	2.9	0.32	0.19	2.2
70	0.40	1.6	1.3	2.9	7.8	18	30	19	11	4.2	0.72	0.40	3.8
60	1.7	4.0	4.8	7.0	10	28	42	26	17	6.8	1.6	0.90	8.0
50	3.4	6.2	11	12	15	38	52	34	24	10	3.1	1.8	14
40	6.1	12	18	16	26	59	68	43	34	15	4.5	3.4	23
30	19	23	25	22	42	96	93	59	49	24	7.2	6.5	36
25	28	29	29	27	50	126	116	71	62	32	9.9	12	46
20	40	33	33	35	64	171	140	96	78	41	14	26	60
15	52	40	45	46	92	252	177	136	109	58	19	50	88
10	80	60	66	64	141	370	250	209	164	108	36	124	142
5	178	137	137	175	250	599	413	342	321	218	113	342	280

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 26 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	235
0.95	1.05	465
0.90	1.11	656
0.80	1.25	977
0.50	2	1,980
0.20	5	3,760
0.10	10	5,110
0.04	25	6,950
0.02	50	8,400
0.01	100	9,880
0.005	200	11,400

Magnitude and frequency of annual high discharges, based on period of record 1956-79

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	72	40	28	18
0.95	1.05	169	101	70	45
0.90	1.11	256	157	108	68
0.80	1.25	412	256	174	110
0.50	2	932	574	381	246
0.20	5	1,880	1,090	713	478
0.10	10	2,600	1,440	932	641
0.04	25	3,560	1,860	1,190	845
0.02	50	4,290	2,150	1,370	991
0.01	100	5,010	2,410	1,530	1,130
0.005	200	5,740	2,650	1,680	1,260

05473500 BIG CREEK NEAR MOUNT PLEASANT, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1956 to March 1979

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41
0.05	20	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.16	0.83
0.10	10	0.00	0.00	0.00	0.00	0.00	0.08	0.43	0.72	1.5
0.20	5	0.00	0.00	0.00	0.00	0.00	0.29	1.1	1.8	3.1
0.50	2	0.00	0.02	0.06	0.19	0.65	2.0	4.6	7.1	11
0.80	1.25	0.46	0.57	0.77	1.1	2.5	8.9	15	23	36
0.90	1.11	0.95	1.2	1.8	2.5	5.3	18	27	40	64
0.96	1.04	2.0	2.2	4.0	5.5	11	35	48	71	115
0.98	1.02	3.1	3.1	6.2	9.0	19	53	69	101	165
0.99	1.01	4.7	4.8	9.3	14	32	75	94	137	226

Magnitude and frequency of seasonal low discharges, based on period of record October 1955 to September 1979

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.03	0.08	0.15	0.98
0.10	10	0.00	0.00	0.00	0.14	0.29	0.55	0.98	3.6
0.20	5	0.32	0.40	0.60	1.3	1.1	1.8	2.9	8.0
0.50	2	3.3	4.1	4.9	9.3	6.1	8.6	12	25
0.80	1.25	13	15	16	30	20	26	33	56
0.90	1.11	21	24	27	47	31	41	48	80
0.96	1.04	33	36	41	68	46	60	67	111
0.98	1.02	43	45	52	83	57	74	80	135
0.99	1.01	52	54	63	96	67	88	92	157
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.19
0.50	2	0.00	0.09	0.28	1.1	0.74	1.2	2.0	3.2
0.80	1.25	0.50	0.97	1.4	3.7	6.1	9.1	12	15
0.90	1.11	0.90	2.0	2.7	6.5	15	21	26	31
0.96	1.04	1.8	3.6	5.2	12	36	44	51	60
0.98	1.02	2.8	5.0	7.7	17	62	69	75	90
0.99	1.01	4.3	6.7	11	23	101	103	106	128

05474000 SKUNK RIVER AT AUGUSTA, IOWA

LOCATION.—Lat 40°45'13", long 91°16'40", in NE1/4 NE1/4 sec. 26, T69N, R4W, Des Moines County, Hydrologic Unit 07080107, on left bank 300 ft upstream from bridge on State Highway 394 at Augusta, 2.0 mi upstream from Long Creek, and at mile 12.5.

DRAINAGE AREA.—4,303 mi^2.

PERIOD OF RECORD.—September to November 1913, October 1914 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water stage recorder. Datum of gage is 521.24 ft above sea level. Prior to November 15, 1913, nonrecording gage at site 400 ft upstream at datum about 0.7 ft higher. May 27, 1915 to January 14, 1935, nonrecording gage at site 400 ft upstream at present datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 66,800 ft^3/s, April 23, 1973, gage height, 27.05 ft; minimum daily discharge, 7.0 ft^3/s, August 27–September 1, 1934.

Selected values from rating table number 9, developed October 1993

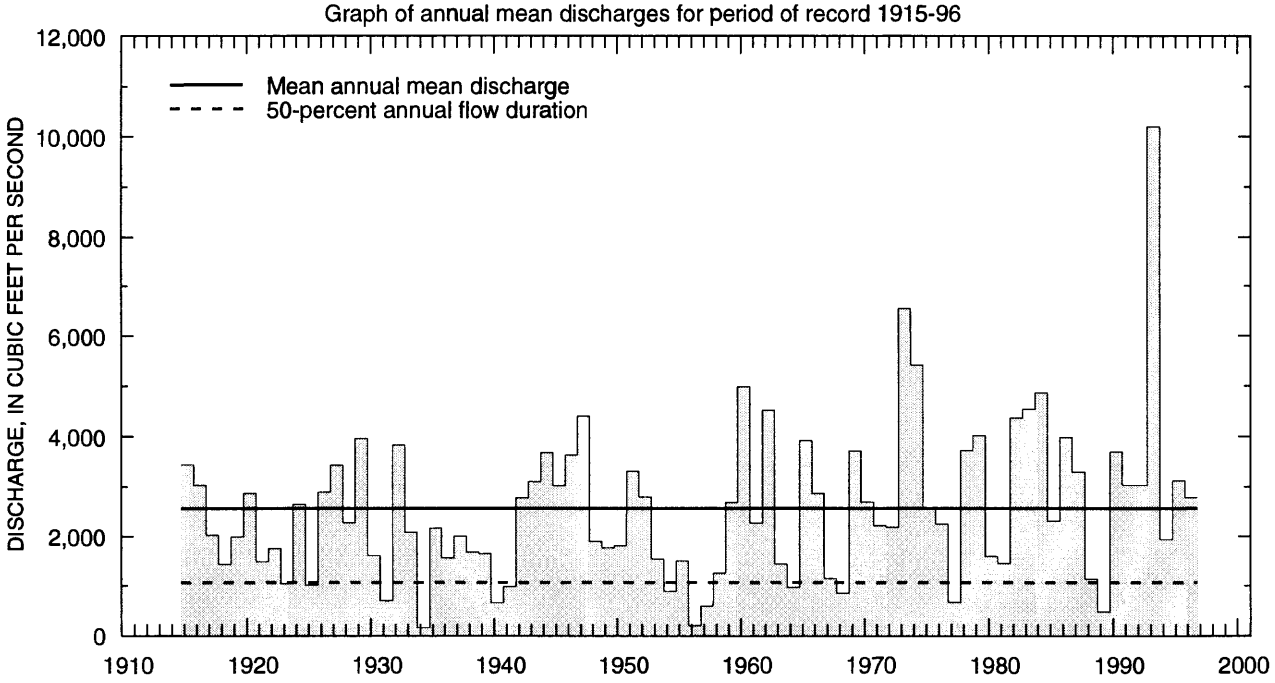
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	124	10.0	10,300
2.0	403	15.0	19,400
3.0	1,300	20.0	31,200
4.0	2,300	24.0	49,500
6.0	4,570	27.5	70,000
8.0	7,240		

05474000 SKUNK RIVER AT AUGUSTA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1915-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	11,560	1987	15.5	1957	1,355	1,840
November	10,020	1962	20.5	1957	1,551	1,959
December	8,387	1983	21.2	1957	1,295	1,574
January	8,090	1946	21.3	1940	1,314	1,846
February	7,306	1984	56.5	1940	2,325	1,757
March	16,560	1979	191	1957	4,352	3,292
April	18,770	1973	104	1956	4,087	3,670
May	16,780	1996	92.5	1934	4,016	3,659
June	19,800	1947	130	1977	4,248	3,689
July	26,860	1993	122	1988	2,828	3,634
August	18,550	1993	25.8	1934	1,717	2,471
September	15,460	1926	71.4	1953	1,657	2,809
Annual	10,200	1993	152	1934	2,560	1,557

Graph of annual mean discharges for period of record 1915-96



05474000 SKUNK RIVER AT AUGUSTA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1915-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	17	25	20	16	23	105	106	95	82	72	37	40	30
95	64	55	40	30	88	247	380	298	294	158	106	71	84
90	90	98	73	64	140	492	623	478	448	300	182	119	144
85	116	128	96	124	200	650	863	649	585	408	230	157	208
80	138	164	140	170	270	920	1,070	811	740	494	275	191	290
75	164	230	185	200	352	1,120	1,230	990	960	596	322	225	380
70	195	304	243	250	480	1,370	1,380	1,200	1,180	704	380	258	474
60	310	500	370	350	650	1,910	1,760	1,660	1,740	1,000	493	350	708
50	466	668	514	500	1,020	2,540	2,250	2,280	2,400	1,330	648	468	1,060
40	697	920	798	710	1,500	3,300	3,090	3,000	3,160	1,760	912	683	1,550
30	1,120	1,310	1,190	1,000	2,400	4,680	4,120	4,070	4,540	2,410	1,280	950	2,300
25	1,490	1,600	1,470	1,300	3,000	6,000	4,820	4,900	5,540	2,970	1,550	1,140	2,840
20	1,930	2,020	1,950	1,650	3,660	7,140	5,800	5,970	6,640	3,680	1,920	1,540	3,600
15	2,530	2,620	2,500	2,000	4,810	8,890	7,400	7,410	8,260	5,090	2,560	2,300	4,780
10	3,570	3,550	3,300	2,890	6,200	11,000	9,910	9,860	10,600	6,850	3,700	3,850	6,740
5	5,620	5,950	4,760	5,480	9,250	14,600	13,900	14,100	14,800	11,400	6,670	8,460	10,600

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 85 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	8,090
0.90	1.11	10,200
0.80	1.25	13,400
0.50	2	21,100
0.20	5	31,400
0.10	10	37,600
0.04	25	44,900
0.02	50	49,800
0.01	100	54,400
0.005	200	58,700

Magnitude and frequency of annual high discharges, based on period of record 1915-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2,200	1,490	893	645
0.95	1.05	4,900	3,650	2,480	1,810
0.90	1.11	7,070	5,480	3,910	2,870
0.80	1.25	10,500	8,390	6,250	4,610
0.50	2	19,100	15,800	12,200	9,060
0.20	5	29,000	23,900	18,300	13,700
0.10	10	33,900	27,700	20,800	15,600
0.04	25	38,400	30,900	22,700	17,100
0.02	50	40,900	32,600	23,500	17,700
0.01	100	42,800	33,700	24,000	18,100
0.005	200	44,200	34,500	24,400	18,400

05474000 SKUNK RIVER AT AUGUSTA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1915 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.9	7.6	7.9	9.6	11	17	20	23	47
0.02	50	10	11	12	14	17	25	31	35	68
0.05	20	17	20	21	25	30	45	55	66	114
0.10	10	28	32	34	40	48	72	91	110	178
0.20	5	47	54	60	68	84	124	162	199	298
0.50	2	123	138	154	173	220	319	435	545	739
0.80	1.25	291	313	346	385	502	727	1,030	1,290	1,660
0.90	1.11	440	460	502	559	735	1,070	1,540	1,910	2,440
0.96	1.04	666	671	719	803	1,070	1,550	2,280	2,790	3,590
0.98	1.02	830	841	889	996	1,330	1,950	2,880	3,490	4,530
0.99	1.01	1,005	1,020	1,060	1,200	1,600	2,360	3,510	4,210	5,530

Magnitude and frequency of seasonal low discharges, based on period of record October 1914 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	9.2	10	11	17	47	68	83	101
0.02	50	14	16	17	26	68	94	115	144
0.05	20	27	30	33	50	114	151	183	241
0.10	10	46	51	58	87	176	226	272	372
0.20	5	84	94	109	163	290	360	431	613
0.50	2	245	275	325	489	692	824	981	1,460
0.80	1.25	629	707	829	1,290	1,480	1,740	2,060	3,140
0.90	1.11	981	1,100	1,280	2,030	2,100	2,500	2,950	4,500
0.96	1.04	1,520	1,710	1,940	3,180	2,970	3,600	4,230	6,410
0.98	1.02	1,980	2,230	2,490	4,170	3,660	4,500	5,270	7,940
0.99	1.01	2,480	2,800	3,060	5,250	4,360	5,450	6,370	9,520
		July-August-September				October-November-December			
0.01	100	14	19	28	47	8.6	12	14	17
0.02	50	20	26	37	59	13	17	20	25
0.05	20	32	42	55	84	23	30	34	44
0.10	10	48	63	78	116	37	48	55	71
0.20	5	78	101	120	172	67	85	96	127
0.50	2	192	239	273	379	193	232	266	361
0.80	1.25	446	537	623	865	514	596	691	952
0.90	1.11	680	802	961	1,350	834	948	1,110	1,540
0.96	1.04	1,050	1,210	1,530	2,190	1,370	1,530	1,810	2,510
0.98	1.02	1,380	1,560	2,060	3,020	1,860	2,050	2,450	3,400
0.99	1.01	1,750	1,960	2,700	4,050	2,430	2,660	3,200	4,440

05474500 MISSISSIPPI RIVER AT KEOKUK, IOWA

LOCATION.—Lat 40°23'37", long 91°22'27", in SE1/4 SW1/4 sec.30, T65N, R4W, Lee County, Hydrologic Unit 07080104, near right bank in tailwater of dam and powerplant of Union Electric Co. at Keokuk, 0.2 mi upstream from bridge on U.S. Highway 136, 2.7 mi upstream from Des Moines River, and at mile 364.2 upstream from Ohio River.

DRAINAGE AREA.—119,000 mi^2, approximately.

PERIOD OF RECORD.—January 1878 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 477.41 ft above sea level (levels by U.S. Army Corps of Engineers). January 1, 1878 to May 1913, nonrecording gage at Galland (formerly Nashville) 8 mi upstream; zero of gage was set to low-water mark of 1864, or 496.52 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 446,000 ft^3/s, July 10, 1993, gage height, 27.58 ft, from floodmark; minimum daily discharge, 5,000 ft^3/s, December 27, 1933.

REMARKS.—Streamflow record provided by Union Electric Co.

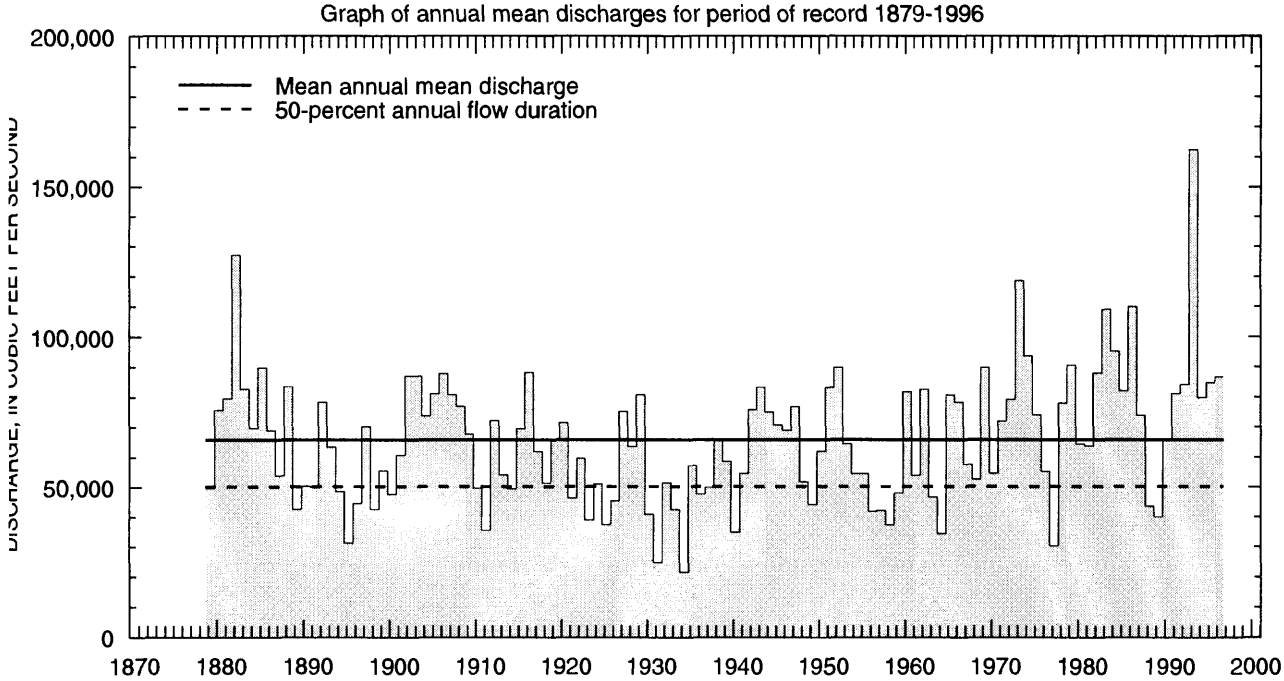
(Rating table not provided because discharge is a function of both river stage and river slope.)

05474500 MISSISSIPPI RIVER AT KEOKUK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1879-1996

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	221,100	1882	16,060	1934	51,260	35,010
November	211,300	1882	16,020	1934	51,160	28,460
December	125,600	1983	13,450	1934	38,550	19,640
January	101,600	1973	14,650	1940	35,860	16,790
February	95,690	1984	15,790	1899	41,780	17,900
March	185,400	1973	21,780	1934	80,490	31,210
April	250,100	1993	32,930	1895	119,300	47,430
May	260,700	1888	27,600	1934	107,700	47,530
June	227,300	1892	17,400	1934	93,060	42,930
July	385,800	1993	16,280	1988	73,420	44,880
August	223,000	1993	13,030	1936	49,120	26,690
September	163,300	1993	15,530	1976	47,810	24,820
Annual	162,500	1993	21,540	1934	65,850	21,790

Graph of annual mean discharges for period of record 1879-1996



05474500 MISSISSIPPI RIVER AT KEOKUK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1879-1996

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	15,600	16,200	10,700	12,400	14,000	20,500	31,200	25,100	18,200	16,000	12,500	14,300	14,500
95	19,100	21,000	15,000	16,700	17,600	27,000	42,900	37,700	30,500	23,400	18,500	18,700	19,500
90	22,400	22,700	17,600	18,200	20,000	32,800	53,300	47,000	39,000	28,300	22,100	21,500	23,000
85	24,000	25,000	20,000	20,000	22,400	36,500	62,300	53,700	45,000	32,700	25,400	24,000	25,800
80	25,500	27,400	21,800	22,000	23,800	41,000	70,800	60,000	51,000	37,000	28,000	25,700	28,500
75	27,100	30,100	23,800	23,000	25,200	45,000	78,100	67,300	56,000	41,000	30,000	28,000	31,500
70	29,000	32,700	25,300	24,200	27,000	50,200	86,500	73,400	61,000	44,600	32,300	30,000	34,500
60	33,000	36,500	28,300	27,500	30,900	58,700	101K	87,000	73,000	53,400	36,800	34,500	41,500
50	38,500	41,800	32,000	31,000	34,300	71,900	114K	99,200	84,200	62,300	41,900	39,300	50,200
40	46,400	50,000	36,800	35,000	39,900	84,500	130K	113K	96,800	74,000	47,800	45,200	61,600
30	56,500	59,600	42,600	39,800	47,000	99,600	145K	129K	111K	86,300	56,000	52,100	77,000
25	63,400	64,400	46,500	42,600	51,500	106K	151K	139K	122K	92,400	60,600	58,400	86,600
20	71,800	70,400	52,000	46,000	56,000	115K	161K	149K	132K	100K	66,500	65,900	98,000
15	80,800	79,200	59,300	50,400	61,500	125K	174K	164K	145K	112K	74,800	74,200	113K
10	92,400	90,100	67,800	58,400	69,400	140K	190K	184K	158K	128K	83,000	86,100	132K
5	126K	111K	81,800	70,800	89,100	166K	218K	206K	185K	156K	98,000	106K	161K

Magnitude and frequency of instantaneous peak discharges based on period of peak-flow record 1851, 1878–1975[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	72,000
0.95	1.05	95,000
0.90	1.11	110,000
0.80	1.25	130,000
0.50	2	170,000
0.20	5	218,000
0.10	10	247,000
0.04	25	290,000
0.02	50	320,000
0.01	100	351,000
0.005	200	377,000

Magnitude and frequency of annual high discharges, based on period of record 1879-1996

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	61,700	57,700	53,700	47,200
0.95	1.05	89,300	84,900	78,400	69,300
0.90	1.11	107,000	102,000	94,200	83,500
0.80	1.25	130,000	125,000	116,000	103,000
0.50	2	181,000	176,000	162,000	146,000
0.20	5	237,000	230,000	214,000	193,000
0.10	10	267,000	258,000	241,000	219,000
0.04	25	297,000	287,000	270,000	246,000
0.02	50	316,000	304,000	288,000	263,000
0.01	100	333,000	319,000	304,000	278,000
0.005	200	347,000	332,000	317,000	291,000

[a] *Upper Mississippi River Water Surface Profiles, River Mile 0.0 to River Mile 847.5, Part I Flow Frequency Estimates Mississippi River Mile 202-840*, Technical Flood Plain Management Task Force of the Upper Mississippi River Basin Commission, 1979. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

05474500 MISSISSIPPI RIVER AT KEOKUK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1878 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6,420	6,910	7,960	9,620	11,600	13,100	14,200	14,800	15,600
0.02	50	7,320	7,830	8,890	10,600	12,600	14,100	15,300	16,100	17,200
0.05	20	8,860	9,400	10,500	12,100	14,300	15,900	17,300	18,500	19,900
0.10	10	10,400	11,000	12,100	13,800	16,100	17,800	19,400	20,900	22,700
0.20	5	12,600	13,300	14,400	16,100	18,600	20,600	22,400	24,400	26,900
0.50	2	17,700	18,500	19,800	21,700	24,700	27,500	30,100	33,300	37,600
0.80	1.25	24,000	25,400	27,200	29,400	33,300	37,700	41,600	46,400	53,900
0.90	1.11	27,800	29,600	32,000	34,500	39,100	45,000	49,800	55,600	65,600
0.96	1.04	32,200	34,600	38,000	41,100	46,700	54,700	60,900	68,000	81,500
0.98	1.02	35,300	38,200	42,300	46,000	52,400	62,300	69,700	77,600	94,200
0.99	1.01	38,200	41,700	46,600	51,000	58,300	70,300	78,900	87,700	108,000

Magnitude and frequency of seasonal low discharges, based on period of record January 1878 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8,450	9,900	11,400	13,300	14,500	16,700	18,400	21,100
0.02	50	9,560	11,100	12,600	14,400	17,000	19,500	21,400	24,700
0.05	20	11,500	13,100	14,600	16,400	21,500	24,300	26,600	30,900
0.10	10	13,400	15,200	16,600	18,500	26,300	29,400	32,200	37,600
0.20	5	16,200	18,100	19,500	21,500	33,200	36,900	40,200	47,100
0.50	2	22,800	25,100	26,500	29,200	50,600	55,500	60,300	70,700
0.80	1.25	31,700	34,300	36,200	40,500	74,600	81,500	88,100	103,000
0.90	1.11	37,400	40,200	42,600	48,600	90,200	98,500	106,000	123,000
0.96	1.04	44,300	47,500	50,800	59,400	110,000	120,000	129,000	148,000
0.98	1.02	49,400	52,800	56,900	67,900	123,000	135,000	146,000	166,000
0.99	1.01	54,300	58,000	63,100	76,800	137,000	150,000	162,000	183,000
		July-August-September				October-November-December			
0.01	100	10,600	11,900	12,900	14,100	7,110	8,800	10,500	13,200
0.02	50	11,700	13,100	14,100	15,400	8,010	9,750	11,500	14,400
0.05	20	13,500	15,100	16,200	17,700	9,580	11,400	13,300	16,400
0.10	10	15,500	17,200	18,400	20,200	11,200	13,200	15,100	18,600
0.20	5	18,300	20,300	21,600	23,900	13,700	15,800	17,900	21,800
0.50	2	25,800	28,300	30,100	33,800	20,000	22,600	25,200	30,300
0.80	1.25	37,200	40,500	43,100	49,300	29,300	33,100	36,600	43,500
0.90	1.11	45,500	49,200	52,700	60,900	35,900	40,600	45,000	53,300
0.96	1.04	56,900	61,100	65,700	77,000	44,600	50,900	56,700	66,900
0.98	1.02	66,000	70,600	76,200	90,200	51,400	59,100	66,200	78,000
0.99	1.01	75,700	80,600	87,300	104,000	58,400	67,700	76,300	89,900

05476500 DES MOINES RIVER AT ESTHERVILLE, IOWA

LOCATION.—Lat 43°23'51", long 94°50'38", in SW1/4 SE1/4 sec. 10, T99N, R34W, Emmet County, Hydrologic Unit 07100002, on right bank in city park, 1200 ft downstream from bridge on State Highway 9 at Estherville, 0.1 mi upstream from School Creek, 2.3 mi upstream from Brown Creek and at mile 404.2.

DRAINAGE AREA.—1,372 mi^2.

PERIOD OF RECORD.—October 1951 to April 1995 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 1,247.55 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 16,000 ft^3/s, April 12, 1969, gage height, 17.68 ft; no flow January 16-18, 1977.

Selected values from rating table number 7, developed October 1982
(A discharge measurement to validate this rating has not been made since March 1995)

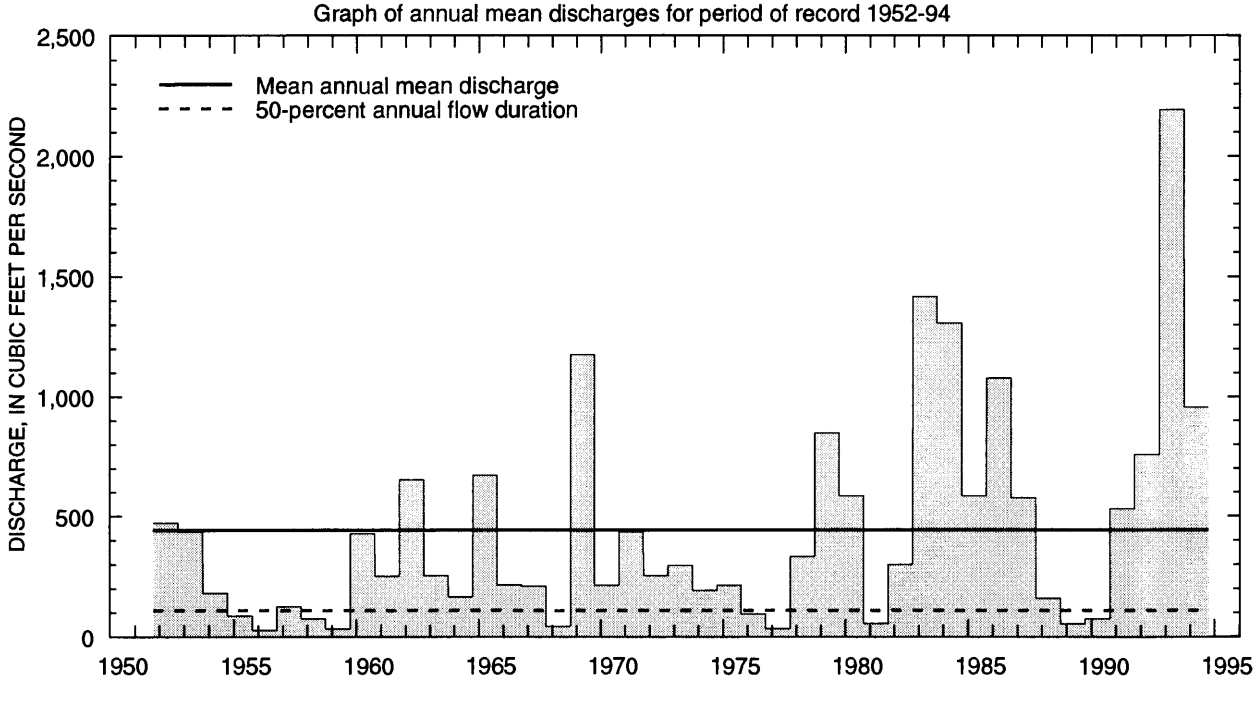
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	36.0	8.0	2,510
3.0	262	10.0	3,600
4.0	659	12.0	5,270
5.0	1,160	15.0	9,420
6.0	1,610	18.0	17,300

05476500 DES MOINES RIVER AT ESTHERVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1952-94

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,980	1987	0.92	1959	213	393
November	1,920	1980	1.66	1959	230	380
December	741	1980	1.32	1956	133	182
January	354	1983	0.46	1977	67.3	85.9
February	703	1983	0.77	1959	93.1	136
March	2,608	1983	16.0	1959	538	561
April	6,314	1969	13.4	1959	1,312	1,560
May	3,969	1993	15.7	1968	788	864
June	5,082	1993	22.6	1976	789	1,013
July	6,127	1993	4.16	1976	659	1,078
August	2,330	1993	2.36	1976	283	490
September	1,541	1979	0.74	1958	200	373
Annual	2,194	1993	26.5	1956	443	454

Graph of annual mean discharges for period of record 1952-94



05476500 DES MOINES RIVER AT ESTHERVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1952-94

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.68	1.6	1.0	0.30	0.60	3.4	10	14	9.3	2.0	0.82	0.50	0.80
95	1.3	2.8	1.8	1.0	1.2	7.4	30	25	17	8.2	2.6	1.3	3.0
90	2.9	9.0	5.8	2.4	3.8	15	55	42	38	15	5.4	4.0	7.8
85	7.9	12	8.8	3.9	4.4	21	91	58	61	25	13	6.9	12
80	12	17	12	4.8	5.8	32	170	87	104	40	24	12	19
75	15	27	16	7.6	10	44	238	141	150	61	34	18	27
70	21	33	21	11	12	63	299	229	202	90	44	23	37
60	37	46	37	17	18	140	437	343	285	154	62	36	61
50	55	75	48	27	26	220	652	458	403	242	90	50	109
40	80	106	73	43	40	335	860	674	568	377	136	77	192
30	124	152	132	76	80	540	1,180	850	784	561	199	117	328
25	167	225	182	94	100	649	1,590	981	898	712	241	152	438
20	239	331	220	114	150	854	2,320	1,220	1,050	919	311	212	597
15	439	456	260	151	180	1,180	2,960	1,620	1,270	1,200	420	289	805
10	629	724	348	204	224	1,710	3,580	2,050	1,790	1,710	743	482	1,150
5	887	1,050	572	272	381	2,200	4,620	2,650	3,180	2,560	1,600	1,050	2,090

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 45 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	256
0.95	1.05	499
0.90	1.11	706
0.80	1.25	1,070
0.50	2	2,290
0.20	5	4,780
0.10	10	6,940
0.04	25	10,200
0.02	50	13,100
0.01	100	16,300
0.005	200	19,800

Magnitude and frequency of annual high discharges, based on period of record 1952-94

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	193	154	122	79
0.95	1.05	382	313	252	182
0.90	1.11	547	455	369	278
0.80	1.25	843	713	585	459
0.50	2	1,910	1,660	1,390	1,140
0.20	5	4,280	3,810	3,260	2,700
0.10	10	6,480	5,840	5,050	4,130
0.04	25	10,100	9,150	8,010	6,390
0.02	50	13,400	12,200	10,800	8,400
0.01	100	17,200	15,800	14,000	10,700
0.005	200	21,700	20,000	17,800	13,300

05476500 DES MOINES RIVER AT ESTHERVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1952 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.06	0.17	0.25	0.45	0.57	0.74	0.74
0.02	50	0.00	0.00	0.14	0.31	0.43	0.74	0.97	1.2	1.2
0.05	20	0.34	0.45	0.50	0.71	0.96	1.5	2.1	2.6	2.8
0.10	10	0.85	1.0	1.2	1.4	1.9	2.8	3.9	4.9	5.7
0.20	5	2.1	2.4	2.5	3.2	4.1	5.8	8.1	10	13
0.50	2	9.2	9.7	12	13	16	21	30	38	52
0.80	1.25	34	35	41	44	51	67	94	123	184
0.90	1.11	65	66	69	78	89	119	163	217	334
0.96	1.04	123	128	130	139	154	209	281	385	604
0.98	1.02	184	194	1195	197	214	297	391	548	866
0.99	1.01	262	282	263	264	283	402	519	743	1,180

Magnitude and frequency of seasonal low discharges, based on period of record October 1951 to April 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.07	0.18	0.25	2.3	2.8	3.4	5.2
0.02	50	0.00	0.16	0.34	0.46	3.9	4.8	5.8	8.8
0.05	20	0.64	0.70	0.84	1.1	8.3	10	13	18
0.10	10	1.6	1.7	1.8	2.3	16	19	24	34
0.20	5	3.8	4.0	4.2	5.2	33	41	50	71
0.50	2	16	19	20	22	126	149	183	247
0.80	1.25	52	61	62	74	410	475	563	739
0.90	1.11	93	97	109	130	722	823	953	1,240
0.96	1.04	163	170	187	226	1,270	1,420	1,600	2,050
0.98	1.02	231	240	256	313	1,790	1,980	2,180	2,780
0.99	1.01	312	320	333	413	2,400	2,620	2,830	3,610
		July-August-September				October-November-December			
0.01	100	0.11	0.26	0.32	0.45	0.14	0.30	0.37	0.42
0.02	50	0.22	0.47	0.58	0.83	0.29	0.55	0.68	0.78
0.05	20	0.61	1.1	1.3	2.0	0.78	1.3	1.6	1.9
0.10	10	1.4	2.3	2.8	4.2	1.8	2.8	3.3	3.9
0.20	5	3.8	5.3	6.6	9.9	4.5	6.4	7.6	9.3
0.50	2	21	25	31	45	22	28	33	42
0.80	1.25	95	107	125	173	84	102	123	160
0.90	1.11	195	218	250	329	154	187	230	301
0.96	1.04	396	453	504	625	276	340	428	565
0.98	1.02	608	713	779	922	389	487	625	826
0.99	1.01	876	1,060	1,140	1,290	517	662	864	1,140

05476750 DES MOINES RIVER AT HUMBOLDT, IOWA

LOCATION.—Lat 42°43'12", long 94°13'06", in SE1/4 SW1/4 sec. 1, T91N, R29W, Humboldt County, Hydrologic Unit 07100002, on left bank 5 ft downstream from First Avenue in City of Humboldt, 0.84 mi downstream from Reasoner Dam, about 700 ft downstream from City of Humboldt water plant, 3.2 mi upstream from Indian Creek, 3.9 mi upstream from East Fork Des Moines River, and at mile 334.3 upstream from mouth of Des Moines River.

DRAINAGE AREA.—2,256 mi^2.

PERIOD OF RECORD.—October 1964 to September 1996. Prior to October 1970, published as West Fork Des Moines River at Humboldt.

GAGE.—Water-stage recorder. Datum of gage is 1,053.54 ft above sea level. Prior to October 3, 1966, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 19,000 ft^3/s, July 13, 1993; maximum gage height, 15.40 ft, April 14, 1969; minimum daily discharge, 13 ft^3/s, November 12, 1976.

REMARKS.—Low-flow discharges occasionally affected by minor regulation at Reasoner Dam.

Selected values from rating table number 8, developed October 1982

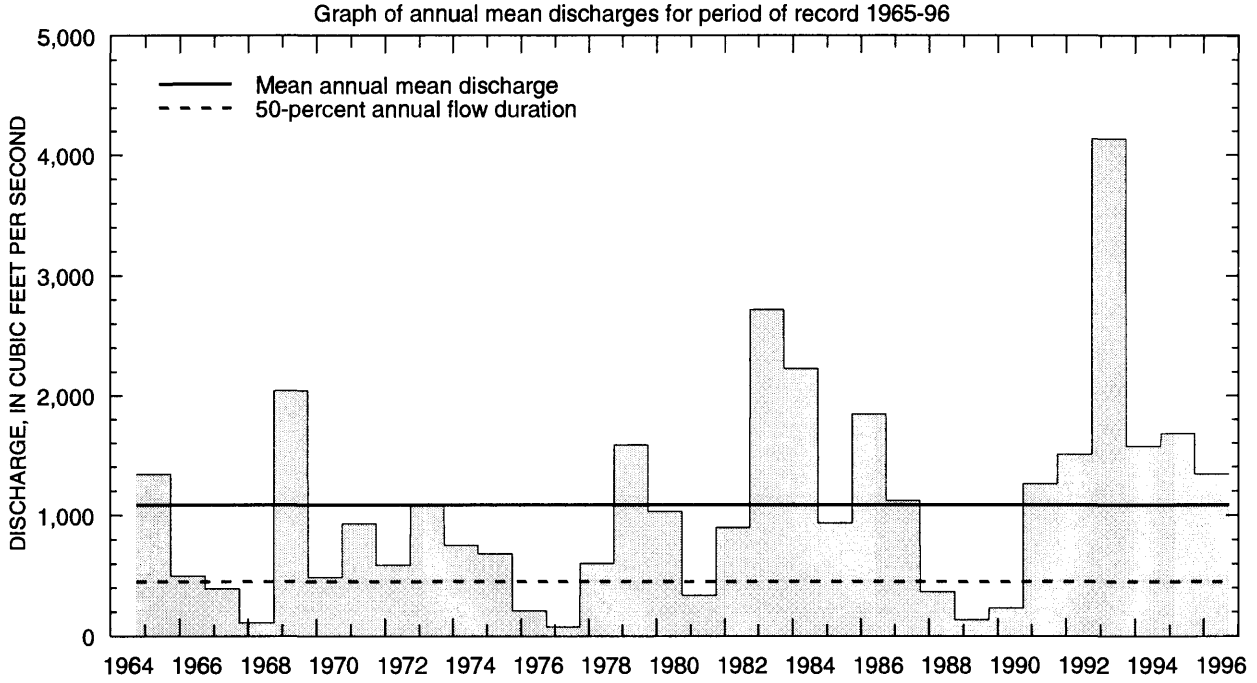
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	141	8.0	4,470
4.0	609	9.0	5,830
5.0	1,304	10.0	7,330
6.0	2,190	12.0	10,700
7.0	3,250	15.0	18,000

05476750 DES MOINES RIVER AT HUMBOLDT, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1965-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,768	1987	20.4	1977	684	823
November	2,656	1980	28.8	1977	670	689
December	1,675	1983	19.9	1977	411	383
January	1,078	1983	13.5	1977	237	237
February	1,571	1983	19.8	1977	321	352
March	5,110	1983	78.9	1968	1,283	1,155
April	8,454	1969	94.4	1968	2,632	2,471
May	6,261	1993	77.6	1968	1,894	1,570
June	9,126	1993	72.3	1977	1,955	1,935
July	11,540	1993	81.0	1976	1,599	2,193
August	4,477	1993	42.4	1976	727	978
September	3,097	1979	30.1	1976	566	734
Annual	4,136	1993	74.3	1977	1,083	870

Graph of annual mean discharges for period of record 1965-96



05476750 DES MOINES RIVER AT HUMBOLDT, IOWA—Continued

Monthly and annual flow durations, based on period of record 1965-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	17	20	18	13	15	36	65	69	51	53	34	27	20
95	37	41	28	22	27	57	119	106	99	80	49	39	42
90	66	67	54	31	38	91	189	211	159	108	67	60	65
85	74	84	65	39	43	140	336	270	312	158	119	78	85
80	81	104	80	48	53	220	534	468	497	246	143	92	112
75	92	130	99	56	62	290	765	602	629	311	163	106	150
70	139	168	126	72	72	358	1,010	740	740	360	189	118	196
60	221	247	190	110	96	498	1,380	1,040	998	539	236	171	295
50	296	380	290	157	156	688	1,670	1,350	1,280	790	313	256	450
40	513	553	380	221	230	900	2,100	1,850	1,600	1,110	444	347	692
30	699	797	500	280	300	1,390	2,850	2,540	2,070	1,590	668	535	1,040
25	910	912	597	320	350	1,690	3,650	2,830	2,460	1,830	826	653	1,290
20	1,130	1,130	689	370	410	2,360	4,490	3,190	2,830	2,350	1,030	795	1,610
15	1,390	1,370	807	440	479	2,910	5,200	3,750	3,530	2,850	1,340	999	2,100
10	1,800	1,900	937	558	795	3,320	6,390	4,370	4,520	3,640	1,790	1,430	2,840
5	2,370	2,360	1,240	713	1,250	4,610	8,290	5,230	7,230	6,230	2,540	2,350	4,400

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	438
0.95	1.05	950
0.90	1.11	1,390
0.80	1.25	2,140
0.50	2	4,460
0.20	5	8,330
0.10	10	11,100
0.04	25	14,600
0.02	50	17,100
0.01	100	19,600
0.005	200	22,000

Magnitude and frequency of annual high discharges, based on period of record 1965-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	411	335	246	190
0.95	1.05	910	763	590	476
0.90	1.11	1,340	1,140	904	741
0.80	1.25	2,080	1,800	1,460	1,220
0.50	2	4,400	3,930	3,310	2,790
0.20	5	8,280	7,610	6,570	5,530
0.10	10	11,000	10,300	8,950	7,480
0.04	25	14,500	13,700	12,000	9,940
0.02	50	17,000	16,200	14,300	11,700
0.01	100	19,500	18,700	16,500	13,400
0.005	200	21,900	21,100	18,600	15,000

05476750 DES MOINES RIVER AT HUMBOLDT, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1965 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.1	8.2	8.6	8.8	9.2	10	11	12	14
0.02	50	11	11	12	12	12	14	16	17	20
0.05	20	16	17	18	18	19	22	26	29	34
0.10	10	23	24	25	27	29	33	40	45	54
0.20	5	36	37	39	41	45	54	66	77	94
0.50	2	78	81	86	91	103	128	165	200	255
0.80	1.25	166	172	179	192	223	291	384	483	648
0.90	1.11	242	250	258	278	328	438	583	741	1,030
0.96	1.04	357	368	376	405	487	666	892	1,150	1,650
0.98	1.02	456	470	475	513	623	866	1,160	1,500	2,220
0.99	1.01	567	582	584	630	774	1,090	1,460	1,900	2,880

Magnitude and frequency of seasonal low discharges, based on period of record October 1964 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8.2	8.8	8.9	9.5	19	26	27	31
0.02	50	11	12	12	13	29	39	42	50
0.05	20	17	19	19	20	55	70	78	95
0.10	10	26	27	28	30	93	116	132	163
0.20	5	41	43	45	49	170	207	240	301
0.50	2	95	100	106	119	485	562	666	850
0.80	1.25	210	222	238	280	1,190	1,350	1,600	2,040
0.90	1.11	312	332	357	432	1,810	2,030	2,380	3,040
0.96	1.04	469	503	543	680	2,720	3,030	3,510	4,440
0.98	1.02	605	654	708	906	3,460	3,860	4,420	5,540
0.99	1.01	757	824	894	1,170	4,240	4,730	5,360	6,670
		July-August-September				October-November-December			
0.01	100	16	20	22	25	8.6	9.7	11	13
0.02	50	20	24	27	32	12	14	16	19
0.05	20	29	34	37	44	20	24	28	32
0.10	10	41	46	51	61	31	37	43	51
0.20	5	62	69	75	91	52	63	73	86
0.50	2	144	157	172	212	129	161	188	224
0.80	1.25	358	393	434	538	303	380	444	547
0.90	1.11	593	659	732	906	459	578	674	849
0.96	1.04	1,040	1,180	1,320	1,630	702	883	1,030	1,330
0.98	1.02	1,510	1,740	1,960	2,410	914	1,150	1,330	1,760
0.99	1.01	2,120	2,500	2,830	3,470	1,150	1,440	1,670	2,250

05478000 EAST FORK DES MOINES RIVER NEAR BURT, IOWA

LOCATION.—Lat 43°12'38", long 94°10'35", in NW1/4 NE1/4 sec.20, T97N, R28W, Kossuth County, Hydrologic Unit 07100003, on right bank 30 ft downstream from bridge on county highway, 0.8 mi upstream from Buffalo Creek, 2.2 mi northeast of Burt, 4.7 mi downstream from Mud Creek, and at mile 389.7 upstream from mouth of Des Moines River.

DRAINAGE AREA.—462 mi^2.

PERIOD OF RECORD.—October 1951 to September 1974 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,114.42 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 5,000 ft^3/s, April 6, 1965, gage height, 14.21 ft; no flow January 24– March 3, 1959.

Selected values from rating table number 4, developed March 1971
(A discharge measurement to validate this rating has not been made since August 1975)

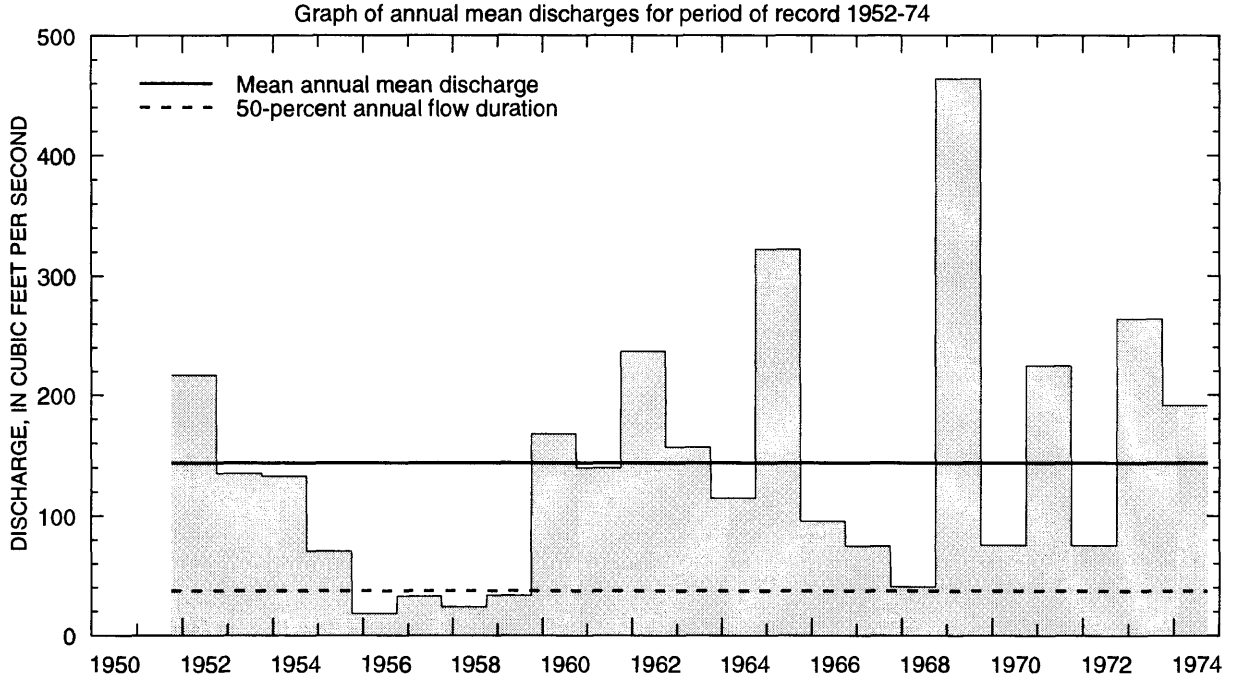
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	7.20	9.0	520
4.5	35.0	10.0	780
5.0	71.5	11.0	1,230
6.0	147	12.0	2,700
7.0	240	13.0	5,200
8.0	360	14.0	9,800

05478000 EAST FORK DES MOINES RIVER NEAR BURT, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1952-74

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	525	1969	0.75	1959	76.2	117
November	312	1969	0.80	1959	66.3	92.3
December	125	1974	0.67	1959	34.0	37.7
January	66.1	1973	0.21	1959	17.5	20.6
February	156	1971	0.000	1959	27.9	40.9
March	800	1971	6.59	1964	209	237
April	2,008	1965	16.5	1959	441	535
May	871	1965	34.3	1968	266	237
June	846	1954	25.7	1956	275	202
July	1,367	1969	19.8	1961	193	308
August	243	1963	1.39	1955	52.4	57.2
September	582	1964	0.50	1955	63.3	135
Annual	464	1969	18.1	1956	144	109

Graph of annual mean discharges for period of record 1952-74



05478000 EAST FORK DES MOINES RIVER NEAR BURT, IOWA—Continued

Monthly and annual flow durations, based on period of record 1952-74

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.50	0.50	0.50	0.00	0.00	0.53	6.4	8.0	2.8	1.8	0.60	0.20	0.30
95	0.70	0.90	0.80	0.40	0.20	2.6	9.6	18	16	5.6	1.3	0.41	0.90
90	0.97	2.3	2.1	0.80	0.80	5.2	22	29	31	11	2.6	0.84	2.3
85	1.8	3.4	2.7	1.5	1.7	6.4	35	41	48	15	4.2	1.3	3.5
80	2.5	4.4	3.6	2.0	2.6	7.6	48	49	59	20	5.4	1.9	4.8
75	3.1	5.2	4.4	2.8	3.0	10	67	63	70	28	6.7	2.6	7.0
70	4.4	6.5	5.1	3.3	3.5	11	83	85	84	34	8.3	3.5	10
60	9.1	14	9.0	4.7	4.4	37	143	134	119	51	14	4.8	20
50	19	28	16	7.1	6.9	74	220	170	156	72	18	8.3	37
40	37	40	29	11	12	108	292	206	235	98	29	14	61
30	88	56	39	23	21	165	435	289	305	133	45	32	103
25	103	68	47	29	26	200	551	344	363	168	60	41	133
20	126	87	61	33	30	278	694	434	432	208	75	59	181
15	160	122	74	38	41	400	880	529	540	321	91	77	250
10	196	189	85	46	56	661	1,100	656	625	569	128	120	386
5	260	270	106	61	118	996	1,760	842	807	829	223	376	682

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 23 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	148
0.95	1.05	280
0.90	1.11	388
0.80	1.25	572
0.50	2	1,160
0.20	5	2,280
0.10	10	3,190
0.04	25	4,510
0.02	50	5,610
0.01	100	6,800
0.005	200	8,070

Magnitude and frequency of annual high discharges, based on period of record 1952-74

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	141	114	70	46
0.95	1.05	259	212	145	101
0.90	1.11	356	292	209	149
0.80	1.25	517	429	321	235
0.50	2	1,040	875	696	521
0.20	5	2,010	1,740	1,410	1,060
0.10	10	2,820	2,460	2,000	1,490
0.04	25	3,990	3,540	2,840	2,080
0.02	50	4,980	4,460	3,530	2,560
0.01	100	6,050	5,470	4,260	3,040
0.005	200	7,220	6,580	5,040	3,550

05478000 EAST FORK DES MOINES RIVER NEAR BURT, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1952 to March 1974

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.06	0.18	0.22	0.22
0.02	50	0.00	0.00	0.00	0.00	0.00	0.13	0.30	0.37	0.38
0.05	20	0.03	0.03	0.04	0.06	0.14	0.33	0.62	0.79	0.89
0.10	10	0.20	0.22	0.26	0.31	0.54	0.72	1.1	1.5	1.8
0.20	5	0.52	0.56	0.64	0.75	1.1	1.6	2.3	3.0	4.1
0.50	2	2.0	2.1	2.3	2.6	3.2	5.9	7.8	11	16
0.80	1.25	5.1	5.4	5.9	6.6	7.6	15	22	31	52
0.90	1.11	7.6	8.1	9.0	9.9	11	21	35	50	88
0.96	1.04	11	12	13	15	16	29	56	81	147
0.98	1.02	13	15	17	18	21	34	74	108	198
0.99	1.01	16	17	20	22	25	38	93	137	255

Magnitude and frequency of seasonal low discharges, based on period of record October 1951 to September 1974

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.69	1.2	2.0	6.5
0.02	50	0.00	0.00	0.00	0.00	1.2	2.0	3.2	9.2
0.05	20	0.08	0.09	0.10	0.17	2.5	4.1	6.3	15
0.10	10	0.41	0.44	0.48	0.70	4.8	7.6	11	24
0.20	5	1.1	1.1	1.2	1.6	10	15	21	39
0.50	2	4.5	4.8	5.0	6.0	35	49	61	96
0.80	1.25	15	15	16	18	103	131	156	218
0.90	1.11	26	27	29	32	169	204	240	324
0.96	1.04	44	46	50	55	272	313	364	484
0.98	1.02	62	65	70	78	361	403	467	619
0.99	1.01	82	87	95	105	457	497	575	766
		July-August-September				October-November-December			
0.01	100	0.04	0.07	0.10	0.31	0.12	0.15	0.16	0.23
0.02	50	0.08	0.12	0.16	0.44	0.19	0.23	0.25	0.37
0.05	20	0.17	0.26	0.33	0.76	0.35	0.45	0.52	0.76
0.10	10	0.34	0.48	0.62	1.2	0.62	0.80	0.99	1.4
0.20	5	0.74	1.0	1.3	2.2	1.2	1.6	2.1	2.9
0.50	2	3.1	3.9	4.8	7.3	4.6	6.0	8.2	11
0.80	1.25	11	14	16	25	17	22	30	40
0.90	1.11	21	25	30	48	34	42	58	77
0.96	1.04	40	47	54	98	71	85	115	149
0.98	1.02	59	70	79	156	115	133	177	226
0.99	1.01	83	98	110	239	176	197	258	326

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IOWA

LOCATION.—Lat 42°43'26", long 94°11'30", in NW1/4 SE1/4 in sec. 6, T91N, R28W, Humboldt County, Hydrologic Unit 07100003, on right bank 50 ft upstream from bridge on County Highway P56, 0.6 mi downstream from bridge on State Highway 3, 3.4 mi upstream from confluence with Des Moines River, and at mile 333.8 upstream from of Des Moines River.

DRAINAGE AREA.—1,308 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996. Prior to October 1954, published as "near Hardy."

GAGE.—Water-stage recorder. Datum of gage is 1.038.71 ft above sea level. Prior to October 1, 1954, nonrecording gage at site 8 mi upstream at different datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 18,800 ft^3/s, June 21, 1954, gage height, 24.02 ft; minimum daily discharge, 4.8 ft^3/s, January 11–14, 1977.

Selected values from rating table number 6, developed July 1988

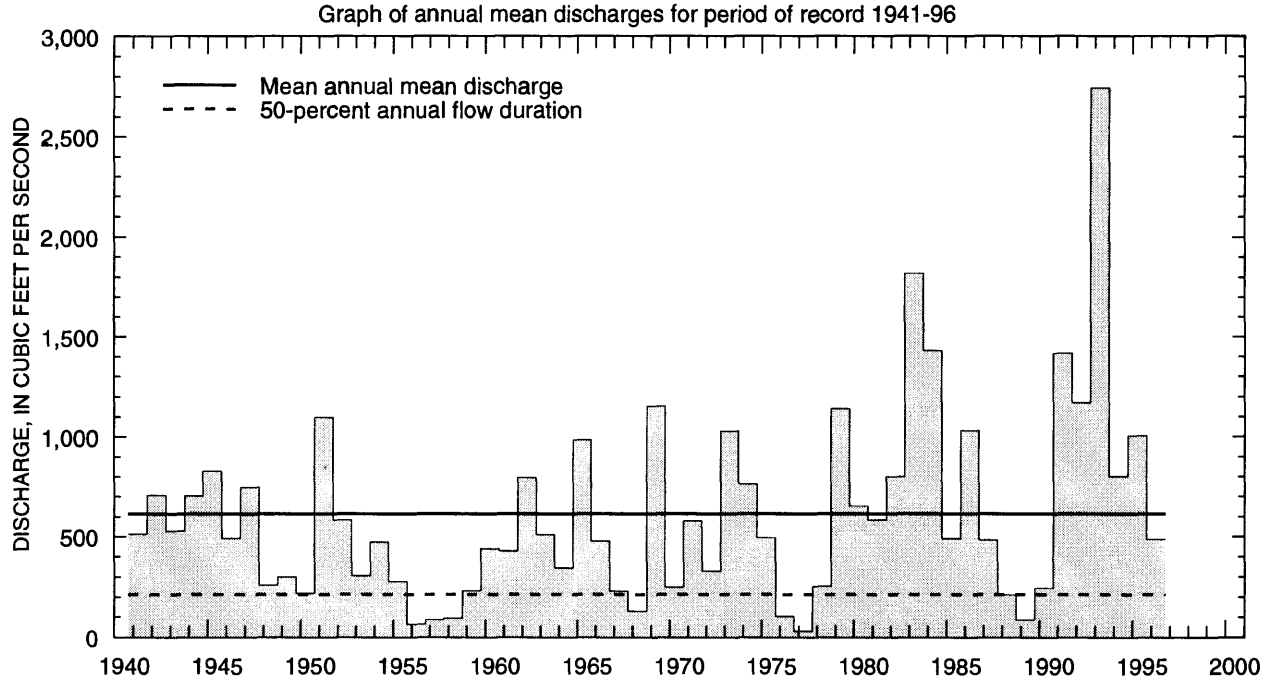
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.5	39.2	14.0	4,160
8.0	143	16.0	6,120
9.0	543	18.0	8,320
10.0	1,140	21.0	12,200
12.0	2,490	24.0	17,400

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,713	1983	12.0	1959	328	420
November	2,042	1942	14.2	1959	320	447
December	1,340	1992	8.45	1977	224	301
January	836	1992	5.12	1977	129	176
February	1,602	1984	10.4	1959	230	336
March	4,033	1983	39.4	1968	895	846
April	7,004	1993	58.8	1977	1,384	1,502
May	5,031	1991	75.7	1977	1,012	947
June	5,908	1993	36.3	1977	1,254	1,236
July	6,777	1993	13.7	1977	850	1,092
August	4,114	1979	15.5	1976	399	677
September	2,666	1979	7.40	1976	342	542
Annual	2,744	1993	29.7	1977	615	487

Graph of annual mean discharges for period of record 1941-96



05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.4	13	9.0	4.9	10	19	38	39	20	14	11	6.6	9.4
95	13	18	14	14	15	30	60	81	78	38	19	11	17
90	16	23	20	16	16	44	103	131	127	64	26	15	23
85	20	28	22	19	19	60	163	177	180	84	34	18	30
80	25	30	26	21	22	85	213	226	248	104	42	23	39
75	30	34	30	24	27	130	272	293	297	133	51	28	53
70	34	41	36	26	30	195	351	357	350	172	62	36	72
60	61	68	51	37	47	290	530	451	544	265	87	57	127
50	102	130	92	57	70	432	740	577	762	393	126	94	212
40	164	225	150	80	112	690	1,060	804	995	564	186	147	335
30	345	302	215	120	160	914	1,540	1,140	1,360	842	315	243	529
25	433	354	276	160	200	1,120	1,860	1,330	1,580	1,040	381	315	700
20	560	427	330	200	255	1,390	2,180	1,610	1,830	1,290	497	404	898
15	760	594	430	240	330	1,780	2,670	1,920	2,100	1,640	693	585	1,210
10	978	895	625	280	500	2,490	3,330	2,410	2,610	2,140	972	986	1,660
5	1,440	1,400	958	511	950	3,530	4,650	3,260	4,920	3,230	1,470	1,660	2,520

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 59 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	448
0.95	1.05	889
0.90	1.11	1,260
0.80	1.25	1,910
0.50	2	4,020
0.20	5	8,030
0.10	10	11,300
0.04	25	16,000
0.02	50	19,900
0.01	100	24,100
0.005	200	28,500

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	338	249	164	120
0.95	1.05	749	606	438	332
0.90	1.11	1,110	927	695	533
0.80	1.25	1,720	1,480	1,150	891
0.50	2	3,670	3,220	2,560	2,000
0.20	5	6,960	5,960	4,700	3,650
0.10	10	9,330	7,760	6,020	4,640
0.04	25	12,400	9,880	7,470	5,700
0.02	50	14,600	11,300	8,390	6,360
0.01	100	16,800	12,600	9,170	6,900
0.005	200	18,900	13,800	9,850	7,360

05479000 EAST FORK DES MOINES RIVER AT DAKOTA CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.4	3.7	4.0	4.5	5.1	5.6	5.8	5.8	5.8
0.02	50	4.3	4.7	5.1	5.6	6.3	7.1	7.6	7.8	7.8
0.05	20	6.2	6.7	7.2	7.8	8.8	10	11	12	13
0.10	10	8.5	9.2	9.7	11	12	14	16	18	21
0.20	5	13	13	14	15	17	22	25	29	37
0.50	2	26	27	29	31	35	48	62	77	109
0.80	1.25	54	56	59	63	74	111	158	211	315
0.90	1.11	79	82	86	92	109	172	262	362	544
0.96	1.04	119	122	128	138	166	278	454	652	969
0.98	1.02	154	157	166	179	219	380	653	960	1,400
0.99	1.01	194	198	210	228	281	505	909	1,360	1,950

Magnitude and frequency of seasonal low discharges, based on period of record March 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.0	5.4	5.6	5.6	10	12	15	26
0.02	50	6.1	6.6	6.8	7.0	15	18	22	36
0.05	20	8.5	9.0	9.4	9.9	26	31	37	58
0.10	10	11	12	13	14	41	50	60	88
0.20	5	17	18	19	21	71	86	103	144
0.50	2	37	40	42	49	195	234	276	366
0.80	1.25	89	96	104	125	501	584	690	911
0.90	1.11	144	159	174	212	799	913	1,080	1,450
0.96	1.04	247	280	311	381	1,290	1,440	1,710	2,380
0.98	1.02	354	410	459	565	1,740	1,900	2,270	3,260
0.99	1.01	495	584	660	813	2,270	2,430	2,910	4,310
		July-August-September				October-November-December			
0.01	100	3.6	4.6	5.0	5.9	3.1	3.7	4.0	4.9
0.02	50	4.6	5.7	6.3	7.5	4.1	4.9	5.3	6.5
0.05	20	6.7	8.2	9.0	11	6.4	7.5	8.3	10
0.10	10	9.6	11	13	16	9.5	11	12	15
0.20	5	15	18	20	26	16	18	21	26
0.50	2	38	43	49	69	42	50	59	73
0.80	1.25	102	115	134	202	124	147	179	225
0.90	1.11	176	201	239	370	223	267	330	419
0.96	1.04	323	376	456	729	428	513	650	835
0.98	1.02	483	573	707	1,150	659	794	1,020	1,320
0.99	1.01	701	847	1,060	1,760	980	1,180	1,550	2,020

05480000 LIZARD CREEK NEAR CLARE, IOWA

LOCATION.—Lat 42°32'35", long 94°20'45", in NE1/4 NE1/4 sec. 11, T89N, R30W, Webster County, Hydrologic Unit 07100004, on right bank 20 ft downstream from bridge on county highway, 2.3 mi downstream from Drainage Ditch 3, 3.0 mi south of Clare and 8.2 mi upstream from South Lizard Creek.

DRAINAGE AREA.—257 mi^2.

PERIOD OF RECORD.—March 1940 to December 1981 (discontinued). Prior to October 1954, published as North Lizard Creek near Clare.

GAGE.—Water-stage recorder and concrete control. Datum of gage is 1.079.30 ft above sea level. Prior to May 6, 1953, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,000 ft^3/s, June 23, 1947, gage height, 16.0 ft, from floodmark; no flow September 30, 1943, August 27–29, 1956, January 15–16, 1968, December 29, 1976–February 10, 1977.

Selected values from rating table number 2,
developed October 1967
A discharge measurement to validate this rating
has not been made since January 1982.

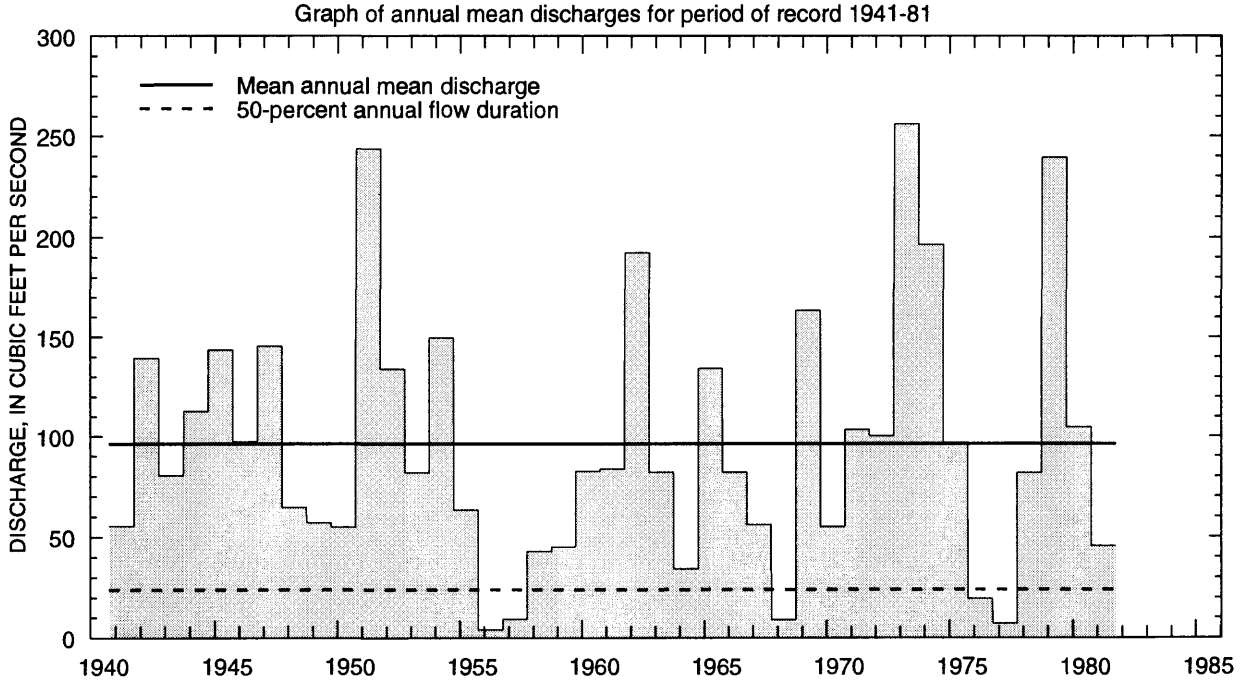
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	1.1	5.0	500
3.2	14	6.0	945
3.5	56	7.0	1,510
3.7	97	8.0	2,150
4.0	173	10.0	3,680
4.5	324	12.0	5,500

05480000 LIZARD CREEK NEAR CLARE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-81

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	403	1974	0.47	1957	47.0	81.4
November	337	1942	1.41	1977	46.7	84.3
December	259	1974	0.066	1977	27.1	47.9
January	106	1942	0.000	1977	16.9	26.0
February	287	1974	0.13	1959	52.2	76.9
March	822	1979	7.82	1977	193	196
April	742	1965	3.79	1956	178	182
May	604	1944	7.17	1968	157	134
June	1,158	1954	1.37	1977	219	228
July	431	1962	1.06	1977	103	107
August	443	1979	0.21	1956	56.0	93.2
September	688	1962	0.32	1955	59.5	125
Annual	256	1973	3.95	1956	96.3	64.3

Graph of annual mean discharges for period of record 1941-81



05480000 LIZARD CREEK NEAR CLARE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-81

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.12	0.73	0.04	0.00	0.02	1.4	2.1	1.6	0.47	0.20	0.10	0.10	0.10
95	0.70	1.5	0.56	0.30	0.30	5.0	7.0	7.5	3.1	1.6	0.60	0.20	0.70
90	1.1	2.1	0.90	0.40	0.40	8.0	13	13	18	5.9	1.6	0.90	1.5
85	1.8	2.8	1.2	0.70	0.91	12	20	27	29	10	3.1	1.5	2.6
80	2.4	3.5	1.7	1.0	1.5	14	30	36	39	14	4.6	2.3	4.0
75	2.9	4.2	2.4	1.3	2.0	18	39	44	48	18	6.4	2.9	5.6
70	3.6	5.3	3.6	1.8	3.0	22	46	52	58	23	7.7	3.6	7.9
60	5.3	10	5.6	4.0	4.6	40	67	71	75	33	10	5.8	14
50	10	14	9.0	5.3	6.8	68	92	95	97	46	14	8.5	24
40	16	20	14	8.0	13	106	124	118	130	64	20	13	43
30	26	32	20	12	25	152	165	148	182	91	30	22	72
25	43	41	24	14	40	188	202	168	226	115	39	30	92
20	60	56	33	23	54	236	261	199	282	150	50	46	121
15	94	70	46	35	75	300	330	246	377	192	72	68	160
10	142	108	74	53	148	487	426	324	555	251	112	106	235
5	222	215	122	72	272	844	636	468	825	355	228	230	394

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 42 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	107
0.95	1.05	261
0.90	1.11	406
0.80	1.25	671
0.50	2	1,590
0.20	5	3,350
0.10	10	4,710
0.04	25	6,560
0.02	50	7,990
0.01	100	9,430
0.005	200	10,900

Magnitude and frequency of annual high discharges, based on period of record 1941-81

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	44	28	22	15
0.95	1.05	141	97	69	49
0.90	1.11	244	171	119	85
0.80	1.25	442	314	213	153
0.50	2	1,120	801	530	374
0.20	5	2,230	1,560	1,030	703
0.10	10	2,940	2,000	1,340	891
0.04	25	3,720	2,470	1,670	1,080
0.02	50	4,200	2,740	1,870	1,190
0.01	100	4,620	2,950	2,030	1,280
0.005	200	4,970	3,130	2,170	1,350

05480000 LIZARD CREEK NEAR CLARE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1981

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.32	0.45
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.46	0.65
0.05	20	0.00	0.00	0.05	0.08	0.12	0.25	0.45	0.78	1.1
0.10	10	0.00	0.07	0.11	0.17	0.26	0.49	0.81	1.3	1.8
0.20	5	0.21	0.21	0.28	0.39	0.58	1.0	1.6	2.3	3.4
0.50	2	1.0	1.1	1.3	1.6	2.3	3.5	5.7	7.4	11
0.80	1.25	4.3	5.0	5.4	6.1	8.4	12	18	25	37
0.90	1.11	9.4	11	11	12	16	22	33	48	71
0.96	1.04	22	23	25	26	33	44	59	96	144
0.98	1.02	37	37	41	42	52	68	86	152	227
0.99	1.01	57	57	63	64	79	101	120	231	344

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to December 1981

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.09	0.19	0.36	1.2
0.02	50	0.00	0.00	0.00	0.00	0.23	0.45	0.76	2.1
0.05	20	0.02	0.09	0.13	0.18	0.81	1.4	2.1	4.6
0.10	10	0.17	0.22	0.29	0.40	2.2	3.4	4.8	8.9
0.20	5	0.46	0.55	0.68	0.92	6.0	8.6	11	18
0.50	2	2.3	2.5	3.0	4.0	26	32	40	56
0.80	1.25	9.5	10	12	16	64	73	91	129
0.90	1.11	20	21	23	33	86	95	121	182
0.96	1.04	42	45	49	70	105	114	151	245
0.98	1.02	68	72	78	115	115	123	166	286
0.99	1.01	105	110	118	180	122	129	178	323
		July-August-September				October-November-December			
0.01	100	0.00	0.02	0.04	0.11	0.00	0.00	0.03	0.10
0.02	50	0.00	0.04	0.08	0.19	0.00	0.00	0.06	0.17
0.05	20	0.00	0.11	0.18	0.42	0.12	0.16	0.16	0.38
0.10	10	0.10	0.26	0.38	0.81	0.27	0.36	0.38	0.74
0.20	5	0.43	0.67	0.91	1.8	0.63	0.83	0.97	1.6
0.50	2	2.6	3.5	4.2	7.1	2.9	3.7	5.0	6.8
0.80	1.25	11	15	17	26	12	16	21	26
0.90	1.11	23	29	32	48	26	34	41	51
0.96	1.04	47	56	63	91	59	77	78	100
0.98	1.02	74	84	95	135	100	130	140	153
0.99	1.01	111	119	136	190	161	211	215	223

05480500 DES MOINES RIVER AT FORT DODGE, IOWA

LOCATION.—Lat 42°30'22", long 94°12'04", in NW1/4 SW1/4 sec. 19, T89N, R28W, Webster County, Hydrologic Unit 07100004, on right bank 400 ft upstream from Soldier Creek, 1,800 ft downstream from Illinois Central Railroad bridge in Fort Dodge, 2,000 ft downstream from Lizard Creek, and at mile 314.6.

DRAINAGE AREA.—4,190 mi^2.

PERIOD OF RECORD.—April 1905 to July 1906 (no winter record), October 1913 to September 1927 (published as "at Kalo"), October 1946 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 969.38 ft above sea level. See WSP 1728 for history of changes prior to December 8, 1949.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 35,600 ft^3/s, April 8, 1965; maximum gage height, 19.62 ft, June 23, 1947; minimum daily discharge, 14 ft^3/s, November 3, 1955.

Selected values from rating table number 10, developed March 1997

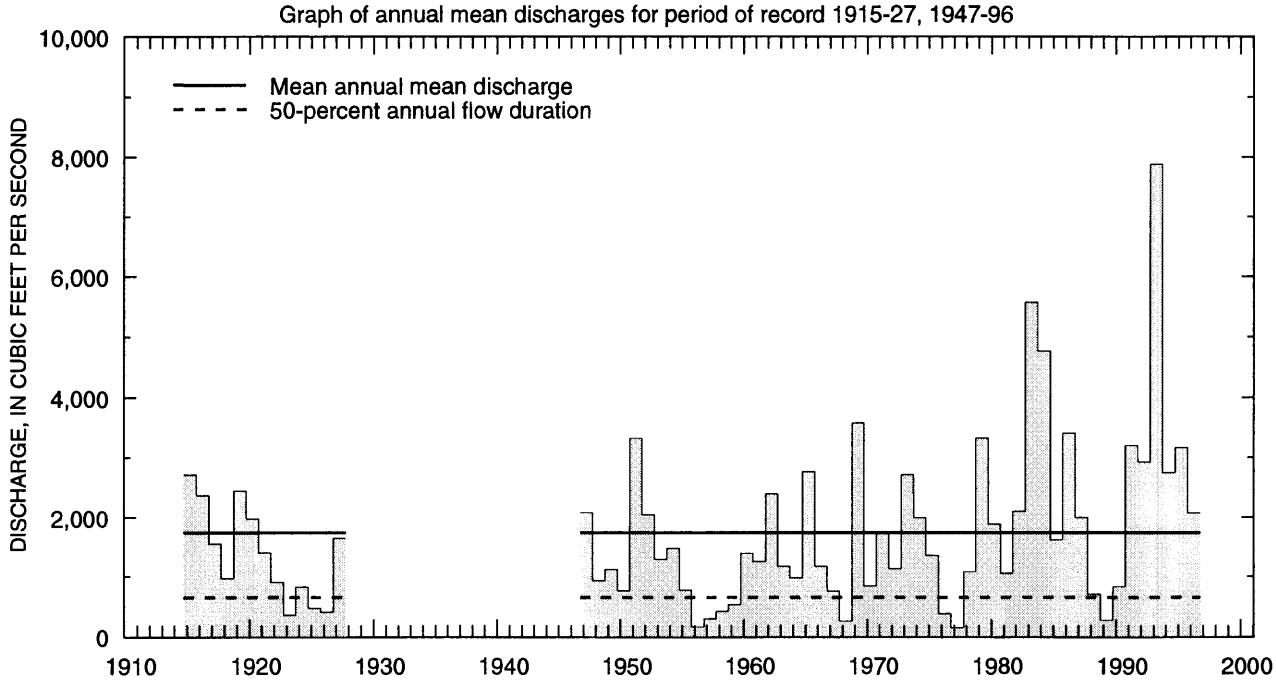
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	135	8.0	10,100
3.5	426	10.0	14,700
4.0	940	12.0	19,700
5.0	2,870	16.0	30,700
6.0	5,890	19.0	39,700

05480500 DES MOINES RIVER AT FORT DODGE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1915-27, 1947-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	6,120	1987	32.8	1957	955	1,190
November	4,447	1983	54.5	1959	876	1,051
December	3,698	1983	34.7	1977	605	717
January	2,257	1983	24.0	1977	393	471
February	4,351	1984	35.5	1959	740	942
March	11,070	1983	141	1968	2,599	2,200
April	17,530	1993	238	1968	4,064	4,081
May	10,540	1991	149	1926	2,900	2,493
June	16,150	1993	138	1977	3,345	3,241
July	21,530	1993	75.2	1926	2,352	3,172
August	9,264	1993	69.0	1976	1,118	1,656
September	6,206	1979	49.9	1976	944	1,274
Annual	7,882	1993	143	1977	1,743	1,381

Graph of annual mean discharges for period of record 1915-27, 1947-96



05480500 DES MOINES RIVER AT FORT DODGE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1915-27, 1947-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	32	42	29	24	30	70	160	141	86	64	52	42	34
95	54	70	43	36	41	124	254	211	210	122	80	58	64
90	76	107	75	50	60	175	392	339	431	207	107	78	100
85	100	132	93	60	74	250	539	504	568	300	155	100	130
80	121	160	110	79	90	320	710	702	668	384	196	124	169
75	144	189	120	98	107	520	912	929	868	448	230	150	211
70	175	210	138	110	122	756	1,150	1,150	1,110	520	268	178	268
60	288	276	206	140	168	1,100	1,840	1,510	1,520	758	342	246	420
50	380	376	300	188	230	1,420	2,480	1,970	2,020	1,110	465	348	650
40	614	584	390	260	410	2,000	3,380	2,580	2,710	1,640	616	485	1,030
30	960	857	630	400	600	2,600	4,610	3,280	3,480	2,340	932	738	1,640
25	1,220	1,130	809	520	685	3,000	5,230	3,840	4,130	2,900	1,180	980	2,040
20	1,580	1,340	980	601	866	4,000	6,590	4,440	5,040	3,460	1,540	1,290	2,580
15	2,050	1,660	1,240	740	1,200	5,350	8,050	5,380	5,980	4,370	1,970	1,730	3,290
10	2,550	2,450	1,660	940	1,990	7,160	9,850	6,740	7,820	5,530	2,730	2,420	4,550
5	3,670	3,460	2,260	1,350	3,320	9,490	13,200	8,930	10,900	8,310	4,000	4,180	7,160

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 66 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,000
0.95	1.05	3,360
0.90	1.11	4,390
0.80	1.25	6,000
0.50	2	10,600
0.20	5	17,800
0.10	10	23,100
0.04	25	30,100
0.02	50	35,400
0.01	100	40,900
0.005	200	46,400

Magnitude and frequency of annual high discharges, based on period of record 1915-27, 1947-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	919	714	518	405
0.95	1.05	2,040	1,660	1,250	955
0.90	1.11	3,000	2,480	1,900	1,450
0.80	1.25	4,610	3,880	3,040	2,300
0.50	2	9,410	8,130	6,530	4,970
0.20	5	16,800	14,700	12,000	9,350
0.10	10	21,600	19,000	15,600	12,400
0.04	25	27,300	24,000	19,800	16,000
0.02	50	31,200	27,500	22,600	18,600
0.01	100	34,800	30,600	25,100	21,000
0.005	200	38,000	33,400	27,500	23,200

05480500 DES MOINES RIVER AT FORT DODGE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1914 to March 1927, April 1947 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	9.2	12	15	18	20	23	25	28	28
0.02	50	12	15	19	22	25	29	32	35	38
0.05	20	18	22	26	30	35	41	46	52	60
0.10	10	25	31	35	41	47	56	64	74	89
0.20	5	38	46	52	58	68	82	98	114	145
0.50	2	88	101	109	120	141	180	225	270	366
0.80	1.25	207	225	237	255	304	409	538	665	923
0.90	1.11	327	344	360	383	459	640	862	1,080	1,500
0.96	1.04	538	544	567	597	722	1,050	1,440	1,850	2,500
0.98	1.02	733	734	765	801	973	1,450	2,020	2,620	3,490
0.99	1.01	960	962	1,000	1,050	1,280	1,950	2,750	3,610	4,700

Magnitude and frequency of seasonal low discharges, based on period of record July 1905 to September 1905, April 1906 to June 1906, January 1914 to September 1927, October 1946 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	16	19	21	29	48	58	84
0.02	50	16	20	23	26	45	70	83	118
0.05	20	23	29	32	37	84	121	142	194
0.10	10	33	39	44	50	142	191	224	298
0.20	5	51	59	65	74	256	325	378	492
0.50	2	121	133	144	169	703	822	956	1,220
0.80	1.25	298	323	346	417	1,660	1,870	2,200	2,830
0.90	1.11	486	528	563	694	2,460	2,760	3,270	4,290
0.96	1.04	831	908	970	1,230	3,600	4,070	4,870	6,560
0.98	1.02	1,180	1,300	1,400	1,800	4,500	5,140	6,210	8,550
0.99	1.01	1,630	1,820	1,960	2,570	5,420	6,280	7,650	10,800
		July-August-September				October-November-December			
0.01	100	16	28	32	35	10	19	21	24
0.02	50	21	34	39	44	14	25	27	31
0.05	20	31	47	53	61	22	37	40	46
0.10	10	45	64	71	84	33	52	57	66
0.20	5	72	93	103	125	54	80	89	104
0.50	2	175	206	227	289	139	188	214	256
0.80	1.25	441	493	549	732	367	460	538	667
0.90	1.11	722	804	909	1,240	615	746	888	1,130
0.96	1.04	1,230	1,390	1,600	2,230	1,070	1,260	1,540	2,000
0.98	1.02	1,750	2,010	2,360	3,310	1,540	1,790	2,210	2,930
0.99	1.01	2,400	2,830	3,370	4,780	2,140	2,450	3,080	4,160

05481000 BOONE RIVER NEAR WEBSTER CITY, IOWA

LOCATION.—Lat 42°26'01", long 93°48'12", in NW1/4 SE1/4 sec. 18, T88N, R25W, Hamilton County, Hydrologic Unit 07100005, on right bank 100 ft upstream from bridge on State Highway 17, 2.5 mi south of Webster City and 3.2 mi downstream from Brewers Creek.

DRAINAGE AREA.—844 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 989.57 ft above sea level. Prior to June 26, 1940, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,300 ft^3/s, June 22, 1954, gage height, 18.55 ft; no flow February 7, 1977.

Selected values from rating table number 8, developed October 1990

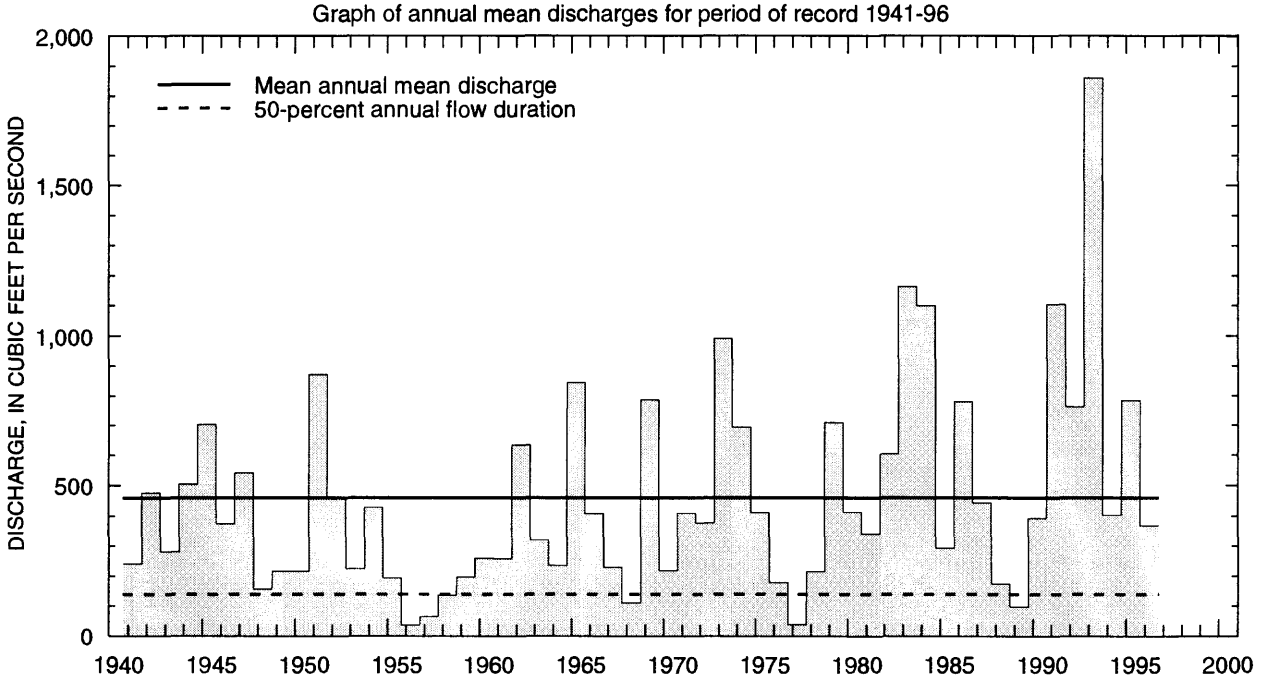
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	7.00	7.0	3,500
2.0	54.0	8.0	4,440
3.0	418	10.0	6,580
4.0	1,000	12.0	8,950
5.0	1,740	14.0	11,400
6.0	2,560	16.0	14,000

05481000 BOONE RIVER NEAR WEBSTER CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,771	1987	6.66	1950	249	364
November	1,395	1993	11.0	1950	219	295
December	1,181	1983	4.62	1977	146	216
January	568	1983	0.32	1977	101	136
February	1,847	1984	3.60	1950	242	363
March	2,826	1973	32.5	1968	800	680
April	4,307	1965	33.7	1957	892	941
May	4,315	1991	46.0	1968	773	747
June	4,238	1984	14.1	1977	1,026	969
July	4,715	1993	8.66	1977	573	745
August	2,942	1993	9.79	1949	257	501
September	2,501	1965	6.48	1976	226	412
Annual	1,861	1993	36.1	1956	459	342

Graph of annual mean discharges for period of record 1941-96



05481000 BOONE RIVER NEAR WEBSTER CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	3.0	9.7	5.1	0.28	0.33	15	26	25	10	5.9	5.2	3.1	4.5
95	8.0	13	9.2	6.0	7.0	32	45	43	46	26	10	6.4	10
90	10	16	12	8.6	10	42	74	79	83	37	16	11	16
85	12	18	15	11	15	56	123	133	131	53	20	14	21
80	15	25	17	14	17	74	175	172	170	73	25	17	30
75	18	32	22	17	20	98	212	214	213	91	32	21	40
70	25	41	29	20	24	150	249	256	255	112	40	26	52
60	45	64	42	26	36	238	323	340	369	159	55	43	86
50	77	90	60	35	54	350	450	432	502	223	76	58	138
40	117	131	95	62	90	520	642	577	690	315	101	80	220
30	195	208	130	90	150	768	900	793	965	475	138	121	352
25	267	251	162	108	180	967	1,080	932	1,120	604	172	159	457
20	392	310	195	135	244	1,220	1,300	1,080	1,400	759	225	218	600
15	506	384	242	160	334	1,520	1,640	1,360	1,820	1,010	314	311	810
10	669	572	361	213	540	2,080	2,140	1,720	2,450	1,440	514	479	1,170
5	990	850	560	424	1,190	3,270	3,070	2,640	3,790	2,120	1,050	882	1,940

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 60 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	860
0.95	1.05	1,520
0.90	1.11	2,020
0.80	1.25	2,820
0.50	2	5,160
0.20	5	8,960
0.10	10	11,700
0.04	25	15,400
0.02	50	18,200
0.01	100	21,100
0.005	200	24,000

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	533	315	201	131
0.95	1.05	1,030	683	454	314
0.90	1.11	1,440	993	672	475
0.80	1.25	2,090	1,510	1,040	749
0.50	2	3,990	3,030	2,140	1,560
0.20	5	6,980	5,350	3,840	2,740
0.10	10	9,050	6,870	4,950	3,460
0.04	25	11,700	8,680	6,260	4,270
0.02	50	13,600	9,930	7,160	4,780
0.01	100	15,400	11,100	7,980	5,230
0.005	200	17,200	12,100	8,730	5,610

05481000 BOONE RIVER NEAR WEBSTER CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.08	0.12	0.32	1.4	3.1	3.9	3.9X
0.02	50	0.74	0.77	0.80	1.0	1.5	2.1	4.2	5.3	5.7
0.05	20	2.2	2.3	2.5	2.9	3.5	4.0	6.7	8.4	10
0.10	10	3.5	3.6	3.7	4.3	5.1	6.7	10	13	16
0.20	5	5.7	6.0	6.7	7.3	8.7	12	17	21	29
0.50	2	14	14	22	24	27	33	43	54	84
0.80	1.25	31	33	36	41	56	78	108	143	232
0.90	1.11	47	49	51	60	75	116	174	237	384
0.96	1.04	73	76	80	85	100	169	290	409	648
0.98	1.02	96	100	120	150	170	211	401	582	900
0.99	1.01	123	127	140	170	200	254	537	801	1,200

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.10	0.14	0.37	5.5	7.3	9.2	13
0.02	50	1.5	1.5	1.5	1.5	8.5	11	14	20
0.05	20	3.8	4.0	4.8	5.2	16	20	25	35
0.10	10	5.8	6.0	7.0	8.0	26	33	41	58
0.20	5	9.6	10	1	13	47	59	72	102
0.50	2	24	27	31	35	128	157	191	276
0.80	1.25	63	78	86	95	300	361	448	673
0.90	1.11	106	110	130	160	443	530	667	1,030
0.96	1.04	187	190	230	260	644	767	983	1,570
0.98	1.02	272	300	350	380	804	955	1,240	2,040
0.99	1.01	383	400	450	500	969	1,150	1,510	2,550
		July-August-September				October-November-December			
0.01	100	1.3	1.7	2.1	4.4	1.1	1.3	1.6	2.8
0.02	50	1.9	2.3	2.9	5.5	1.6	2.0	2.4	3.9
0.05	20	3.1	3.8	4.6	7.9	2.9	3.5	4.2	6.3
0.10	10	4.9	5.7	6.9	11	4.9	5.7	6.8	9.7
0.20	5	8.3	9.5	11	17	8.9	10	12	16
0.50	2	22	25	29	42	26	31	37	46
0.80	1.25	56	64	74	114	71	88	106	132
0.90	1.11	89	105	121	201	116	149	183	233
0.96	1.04	145	176	204	378	191	259	325	427
0.98	1.02	197	245	286	578	262	368	468	635
0.99	1.01	259	330	387	858	344	501	647	911

05481300 DES MOINES RIVER NEAR STRATFORD, IOWA

LOCATION.—Lat 42°15'04", long 93°59'52", in NW1/4 NE1/4 sec. 21, T86N, R27W, Webster County, Hydrologic Unit 07100004, on right bank 6 ft downstream from bridge on State Highway 175, 0.1 mi downstream from Skillet Creek, 4.0 mi southwest of Stratford, 7.3 mi downstream from Boone River and at mile 276.7.

DRAINAGE AREA.—5,452 mi^2.

PERIOD OF RECORD.—October 1967 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 894.00 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 42,300 ft^3/s, April 2, 1993, gage height, 25.68 ft; minimum daily discharge, 13 ft^3/s, January 23–24, 1977.

Selected values from rating table number 6, developed October 1987

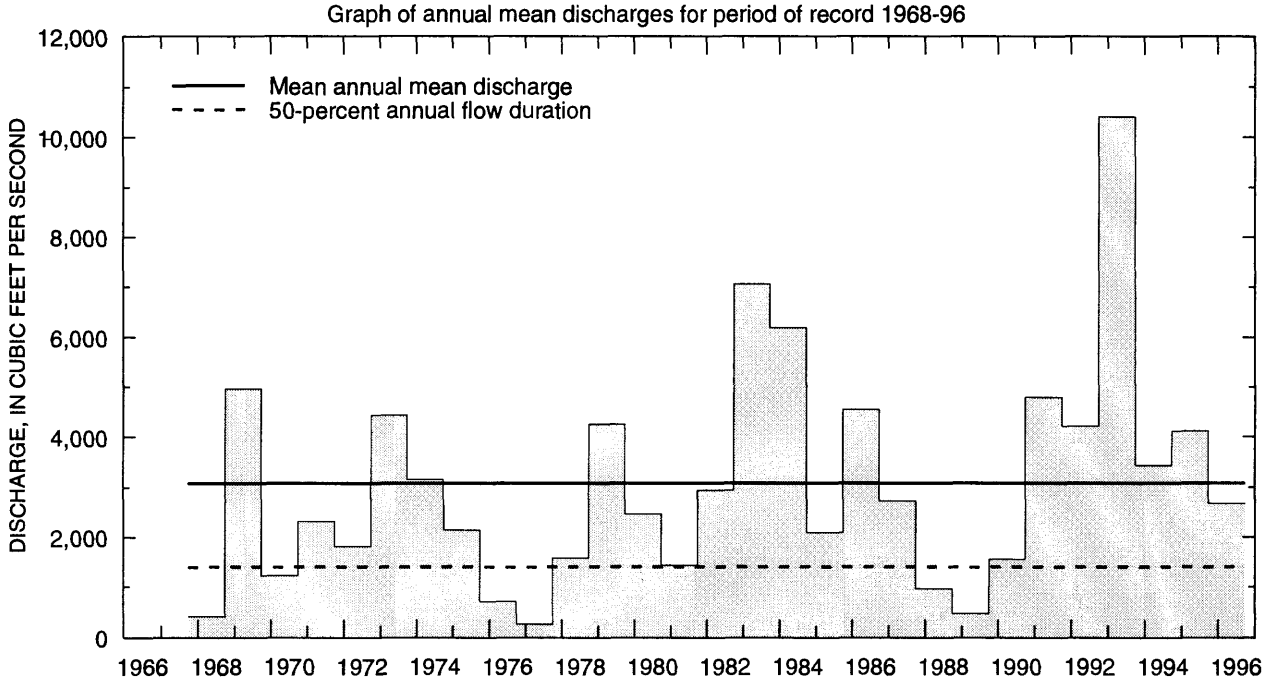
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	120	12.0	8,150
5.0	529	16.0	15,000
6.0	1,140	20.0	24,000
8.0	2,900	24.0	36,000
10.0	5,300	30.0	60,000

05481300 DES MOINES RIVER NEAR STRATFORD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1968-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	8,763	1987	69.4	1977	1,812	2,055
November	5,745	1993	96.3	1977	1,788	1,704
December	5,267	1983	44.4	1977	1,303	1,325
January	3,267	1992	18.7	1977	791	824
February	7,061	1984	57.7	1977	1,266	1,737
March	13,920	1983	204	1968	4,357	3,633
April	22,020	1993	355	1968	6,318	5,511
May	16,010	1991	296	1968	5,316	4,143
June	21,310	1993	177	1977	5,891	5,313
July	27,250	1993	156	1977	4,447	5,390
August	13,500	1993	122	1976	2,108	3,009
September	7,546	1993	69.5	1976	1,478	1,776
Annual	10,400	1993	254	1977	3,079	2,245

Graph of annual mean discharges for period of record 1968-96



05481300 DES MOINES RIVER NEAR STRATFORD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1968-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	45	74	32	16	26	139	178	228	118	118	74	57	49
95	110	131	63	58	89	200	412	361	294	186	127	110	130
90	135	166	144	116	132	270	611	761	800	318	187	167	180
85	152	232	184	142	154	370	853	1,250	1,100	528	294	200	240
80	187	282	240	166	182	696	1,320	1,540	1,500	677	355	238	318
75	281	392	280	195	192	1,040	2,040	1,850	1,770	922	432	306	450
70	384	478	330	225	204	1,300	2,420	2,120	2,030	1,280	500	354	580
60	550	752	620	300	274	1,740	3,180	3,050	2,820	1,880	726	508	903
50	763	1,020	825	460	540	2,450	4,250	3,850	3,860	2,420	987	688	1,390
40	1,180	1,570	1,160	680	680	3,290	5,860	4,820	4,900	3,320	1,340	934	2,050
30	2,200	2,140	1,450	970	1,000	4,640	7,380	6,510	6,430	4,510	1,800	1,360	3,040
25	2,670	2,490	1,700	1,050	1,100	5,900	8,940	7,830	7,510	5,380	2,110	1,650	3,730
20	3,330	2,960	2,080	1,120	1,220	7,600	10,700	8,930	8,740	6,440	2,570	1,870	4,610
15	3,980	3,590	2,460	1,360	1,790	9,410	12,900	10,000	11,000	7,670	3,280	2,410	5,960
10	4,800	4,560	3,000	1,900	3,100	12,100	15,300	11,900	14,200	9,860	4,510	3,680	8,230
5	6,070	5,940	4,140	2,650	5,000	15,300	18,200	14,500	19,600	16,700	8,710	5,830	12,400

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 92 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	4,440
0.90	1.11	5,830
0.80	1.25	8,030
0.50	2	14,300
0.20	5	24,400
0.10	10	31,600
0.04	25	41,300
0.02	50	48,700
0.01	100	56,300
0.005	200	63,900

[a] Analysis includes peak discharges (1905-29, 1931, 1933-67) from station 05481500 Des Moines River near Boone.

Magnitude and frequency of annual high discharges, based on period of record 1968-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,630	1,100	781	521
0.95	1.05	3,600	2,670	1,960	1,420
0.90	1.11	5,220	4,040	3,020	2,260
0.80	1.25	7,840	6,330	4,830	3,750
0.50	2	14,100	12,800	10,200	8,330
0.20	5	24,100	21,700	18,000	15,000
0.10	10	29,800	26,700	22,600	19,000
0.04	25	35,500	32,000	27,600	23,200
0.02	50	39,000	35,100	30,800	25,700
0.01	100	41,900	37,700	33,400	27,900
0.005	200	44,400	39,900	35,700	29,700

05481300 DES MOINES RIVER NEAR STRATFORD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1968 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	11	11	12	15	18	23	29	37	42
0.02	50	17	18	20	23	27	34	43	54	64
0.05	20	32	34	37	41	50	60	76	94	115
0.10	10	55	58	62	68	81	97	123	150	187
0.20	5	97	102	108	117	138	165	212	257	328
0.50	2	241	252	264	282	329	407	540	658	863
0.80	1.25	478	494	517	559	649	860	1,200	1,510	1,990
0.90	1.11	631	647	680	746	865	1,200	1,730	2,240	2,940
0.96	1.04	804	818	863	966	1,120	1,650	2,460	3,300	4,290
0.98	1.02	915	925	980	1,110	1,290	1,980	3,030	4,180	5,380
0.99	1.01	1,010	1,020	1,080	1,240	1,440	2,300	3,620	5,110	6,510

Magnitude and frequency of seasonal low discharges, based on period of record October 1967 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	12	14	16	20	55	66	78	129
0.02	50	19	21	24	29	87	105	124	193
0.05	20	37	40	44	51	168	201	237	342
0.10	10	64	68	72	82	287	345	406	555
0.20	5	117	124	128	143	525	628	739	962
0.50	2	324	339	351	388	1,440	1,700	2,010	2,490
0.80	1.25	751	790	849	954	3,330	3,820	4,530	5,640
0.90	1.11	1,090	1,160	1,290	1,470	4,820	5,430	6,470	8,250
0.96	1.04	1,550	1,660	1,940	2,280	6,830	7,530	9,030	11,900
0.98	1.02	1,890	2,060	2,480	2,990	8,350	9,080	10,900	14,900
0.99	1.01	2,230	2,450	3,070	3,760	9,850	10,600	12,800	17,900
		July-August-September				October-November-December			
0.01	100	37	44	49	55	14	17	20	27
0.02	50	47	55	61	71	22	26	30	40
0.05	20	69	79	88	104	42	48	56	72
0.10	10	96	109	122	148	71	81	95	118
0.20	5	146	164	183	228	129	147	172	210
0.50	2	331	367	415	542	356	417	493	592
0.80	1.25	772	858	985	1,340	838	1,040	1,250	1,530
0.90	1.11	1,210	1,360	1,580	2,190	1,240	1,600	1,950	2,430
0.96	1.04	1,990	2,260	2,650	3,730	1,790	2,440	3,030	3,870
0.98	1.02	2,740	3,160	3,730	5,320	2,230	3,140	3,960	5,170
0.99	1.01	3,670	4,300	5,110	7,340	2,670	3,900	4,980	6,640

05481500 DES MOINES RIVER NEAR BOONE, IOWA

LOCATION.—Lat 42°04'38", long 93°56'06", in NE1/4 NE1/4 sec. 24, T84N, R27W, Boone County, Hydrologic Unit 07100004, on left bank 30 ft upstream from Boone Water Department dam, 2 miles northwest of Boone, 2.2 miles upstream from Bluff Creek, and at mile 158.8.

DRAINAGE AREA.—5,511 mi^2.

PERIOD OF RECORD.—April 1920 to September 1968 (discontinued). Monthly discharge only for some periods, published in WSP 1308. December 1904 to April 1920 (frequently gage heights during high water periods only) in reports of U.S. Weather Bureau.

GAGE.—Water-stage recorder; concrete control since October 20, 1932. Datum of gage is 872.16 ft above sea level. See Water Resources Data for Iowa, 1968, for history of gage datums prior to September 1934.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 57,400 ft^3/s, June 22, 1954, gage height, 25.35 ft; minimum daily discharge, 17 ft^3/s, January 28, 1940.

Selected values from rating table number 4, developed October 1967
(A discharge measurement to validate this rating has not been made since September 1969)

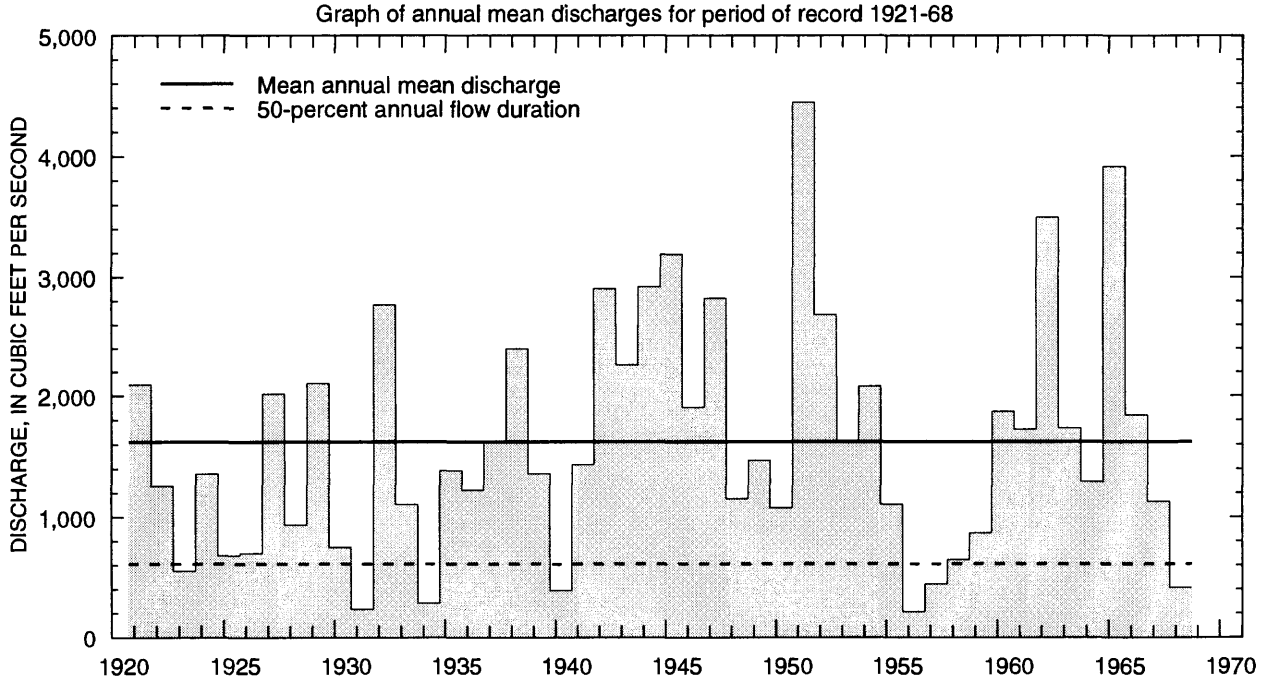
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	1,440	12.0	18,500
2.0	3,600	15.0	25,000
4.0	6,200	18.0	32,700
6.0	8,700	21.0	41,900
8.0	11,600	24.0	52,800
10.0	14,900	26.0	60,600

05481500 DES MOINES RIVER NEAR BOONE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1921-68

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4,634	1966	47.2	1957	770	893
November	5,400	1942	82.5	1959	694	902
December	2,098	1932	54.7	1959	453	481
January	4,781	1932	25.7	1940	435	740
February	2,999	1927	42.3	1959	808	820
March	7,171	1932	132	1934	2,821	2,105
April	21,730	1965	236	1931	3,737	4,218
May	11,130	1944	131	1934	2,613	2,211
June	13,150	1954	213	1926	3,271	2,960
July	8,208	1951	96.1	1926	1,801	1,798
August	3,693	1945	81.4	1931	918	927
September	9,194	1938	67.2	1955	1,139	1,789
Annual	4,443	1951	213	1956	1,621	991

Graph of annual mean discharges for period of record 1921-68



05481500 DES MOINES RIVER NEAR BOONE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1921-68

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	43	62	46	22	33	90	180	110	119	64	51	50	45
95	74	91	60	45	51	146	288	200	203	132	86	73	78
90	95	115	82	58	62	210	440	301	362	222	123	96	110
85	115	141	100	80	87	285	728	450	534	285	166	113	142
80	133	160	115	98	109	400	890	628	622	365	204	142	176
75	155	187	130	100	120	565	1,070	848	796	474	235	169	215
70	174	220	150	110	145	760	1,250	1,020	950	580	265	200	261
60	235	277	186	142	200	1,300	1,700	1,400	1,430	729	334	260	402
50	347	340	250	185	310	1,800	2,160	1,840	1,930	960	423	370	610
40	525	430	340	240	485	2,440	2,670	2,360	2,650	1,350	558	487	958
30	790	647	450	347	750	3,010	3,360	2,900	3,660	1,890	811	737	1,520
25	1,000	802	540	425	982	3,470	4,200	3,320	4,160	2,190	1,030	952	1,880
20	1,240	970	649	501	1,140	4,160	5,160	3,910	4,990	2,630	1,330	1,270	2,360
15	1,590	1,150	819	650	1,410	5,180	6,330	4,730	5,930	3,280	1,760	1,860	2,940
10	1,960	1,500	1,120	900	2,010	6,290	8,970	5,640	7,530	4,340	2,440	2,770	4,070
5	2,580	2,210	1,730	1,520	3,200	9,530	12,700	7,060	10,300	6,530	3,330	4,690	6,220

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 62 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	4,200
0.90	1.11	5,480
0.80	1.25	7,490
0.50	2	13,400
0.20	5	23,100
0.10	10	30,500
0.04	25	40,500
0.02	50	48,500
0.01	100	56,900
0.005	200	65,600

Magnitude and frequency of annual high discharges, based on period of record 1921-68

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,320	1,080	809	546
0.95	1.05	2,580	2,150	1,640	1,170
0.90	1.11	3,620	3,030	2,330	1,700
0.80	1.25	5,360	4,510	3,480	2,580
0.50	2	10,800	9,120	7,040	5,290
0.20	5	20,600	17,200	13,100	9,690
0.10	10	28,200	23,300	17,600	12,800
0.04	25	38,600	31,500	23,400	16,600
0.02	50	46,900	38,000	27,900	19,400
0.01	100	55,500	44,500	32,400	22,000
0.005	200	64,500	51,200	36,800	24,600

05481500 DES MOINES RIVER NEAR BOONE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1920 to March 1968

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	19	21	22	25	28	34	38	43	43
0.02	50	22	24	26	28	32	40	46	52	55
0.05	20	27	30	32	36	41	51	61	70	80
0.10	10	34	37	40	44	52	65	79	92	112
0.20	5	44	49	52	58	69	88	109	129	169
0.50	2	79	86	93	103	126	165	211	255	369
0.80	1.25	149	162	176	195	240	327	428	521	809
0.90	1.11	214	232	252	279	345	478	631	769	1,220
0.96	1.04	321	347	379	416	516	730	969	1,180	1,890
0.98	1.02	421	456	498	546	675	970	1,290	1,560	2,520
0.99	1.01	542	586	641	701	867	1,260	1,680	2,020	3,250

Magnitude and frequency of seasonal low discharges, based on period of record April 1920 to September 1968

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	22	23	24	26	41	49	56	85
0.02	50	25	27	29	31	60	71	82	120
0.05	20	32	36	38	42	101	120	139	198
0.10	10	41	46	50	55	158	188	217	302
0.20	5	55	64	69	79	263	313	361	491
0.50	2	110	128	140	169	641	755	874	1,160
0.80	1.25	245	278	305	394	1,400	1,620	1,880	2,510
0.90	1.11	392	431	473	637	2,030	2,310	2,690	3,630
0.96	1.04	671	708	774	1,100	2,920	3,270	3,810	5,230
0.98	1.02	969	988	1,080	1,580	3,630	4,010	4,700	6,540
0.99	1.01	1,370	1,370	1,470	2,220	4,380	4,780	5,610	7,920
		July-August-September				October-November-December			
0.01	100	21	29	34	44	25	30	34	40
0.02	50	26	35	40	52	30	35	40	47
0.05	20	36	46	53	68	39	45	51	61
0.10	10	48	60	68	89	50	58	65	78
0.20	5	70	85	96	125	68	79	89	108
0.50	2	154	179	202	268	126	155	174	214
0.80	1.25	372	421	474	655	243	332	379	467
0.90	1.11	612	689	777	1,110	348	513	594	731
0.96	1.04	1,070	1,200	1,370	2,030	518	840	992	1,210
0.98	1.02	1,560	1,760	2,010	3,070	673	1,170	1,410	1,710
0.99	1.01	2,220	2,510	2,880	4,530	856	1,610	1,960	2,360

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA

LOCATION.—Lat 41°40'50", long 93°40'05", near center of sec. 5, T79N, R24W, Polk County, Hydrologic Unit 07100004, on left bank 5 ft upstream of Fisher Bridge on County Highway R6F, 2.0 mi west of Saylorville, 2.1 mi downstream from Rock Creek, 2.3 mi downstream from Saylorville Dam, 2.3 mi upstream from Beaver Creek, and at mile 211.4.

DRAINAGE AREA.—5,841 mi^2.

PERIOD OF RECORD.—October 1961 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 787.42 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to August 6, 1970, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 47,400 ft^3/s, April 10, 1965, gage height, 24.02 ft; minimum daily discharge, 13.0 ft^3/s, January 25, 1977.

REMARKS.—Flow regulated since April 12, 1977, by dam at Saylorville Lake (station 05481630) 2.3 mi upstream.

Selected values from rating table number 23, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	200	12.0	11,300
4.0	739	15.0	16,900
5.0	1,570	18.0	23,300
6.0	2,580	21.0	32,300
8.0	5,030	26.0	53,000
10.0	7,960		

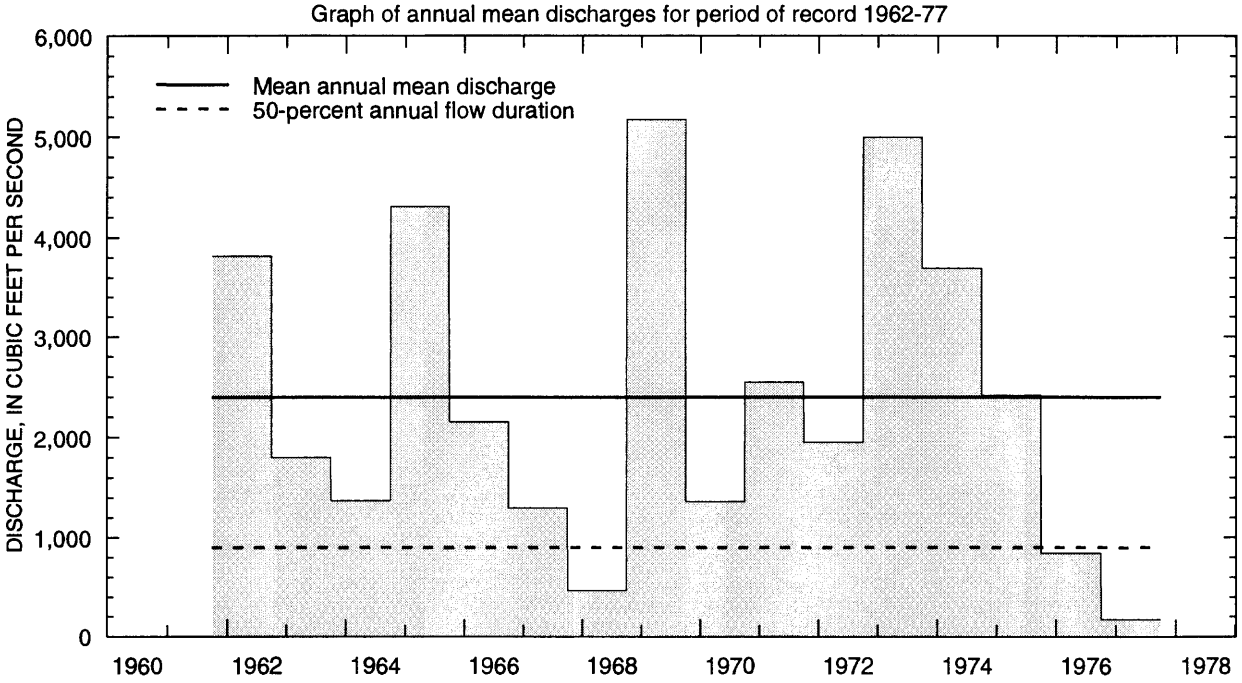
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1962-77

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	6,196	1974	82.1	1977	1,677	2,023
November	4,943	1973	109	1977	1,335	1,491
December	3,149	1974	49.3	1977	787	826
January	2,667	1973	20.1	1977	576	750
February	2,875	1973	53.5	1977	761	905
March	13,370	1973	222	1968	3,301	3,448
April	23,110	1965	308	1977	6,323	6,688
May	8,636	1973	199	1977	4,200	2,661
June	8,858	1967	154	1977	4,244	2,656
July	14,630	1969	99.0	1977	2,972	3,468
August	4,058	1972	94.5	1977	1,145	1,153
September	6,611	1962	77.9	1976	1,419	1,962
Annual	5,175	1969	172	1977	2,398	1,568

Graph of annual mean discharges for period of record 1962-77



05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1962-77

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	64	74	29	15	19	110	193	175	100	100	76	60	38
95	82	119	65	23	81	210	216	215	198	100	96	89	100
90	136	152	103	69	105	260	459	337	572	361	173	160	152
85	155	184	122	110	130	293	982	650	1,240	564	281	184	200
80	176	214	150	130	163	406	1,200	1,290	1,500	686	322	211	249
75	196	291	210	145	190	470	1,390	1,910	1,850	830	374	240	298
70	219	325	265	170	210	580	1,630	2,250	2,080	928	410	268	364
60	346	562	370	250	230	1,070	2,570	2,760	2,510	1,260	512	325	570
50	634	798	510	310	260	1,650	3,220	3,550	3,240	1,760	590	390	901
40	1,150	968	617	352	370	2,200	4,930	4,510	4,090	2,130	708	542	1,520
30	1,770	1,380	780	440	521	3,070	7,020	5,380	5,000	3,090	999	807	2,280
25	2,140	1,590	900	548	614	3,590	7,820	5,980	5,490	3,730	1,180	1,030	2,820
20	2,590	1,850	1,260	640	888	4,460	10,500	6,420	6,080	4,380	1,420	1,410	3,560
15	3,150	2,430	1,600	945	1,400	6,040	13,000	7,080	7,610	5,390	1,840	2,020	4,690
10	4,240	3,460	2,000	1,670	1,870	10,600	16,400	8,020	9,170	6,630	2,600	4,090	6,250
5	7,270	5,130	2,450	2,410	3,570	13,800	21,800	10,800	12,300	10,100	4,200	6,810	9,690

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 15 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,720
0.95	1.05	4,710
0.90	1.11	6,220
0.80	1.25	8,580
0.50	2	15,200
0.20	5	25,300
0.10	10	32,400
0.04	25	41,500
0.02	50	48,300
0.01	100	55,000
0.005	200	61,700

Magnitude and frequency of annual high discharges, based on period of record 1962-77

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	567	502	418	361
0.95	1.05	1,910	1,630	1,320	1,100
0.90	1.11	3,310	2,800	2,240	1,840
0.80	1.25	5,920	4,990	3,970	3,220
0.50	2	14,100	12,100	9,600	7,620
0.20	5	25,100	22,400	18,100	14,200
0.10	10	30,900	28,300	23,000	18,000
0.04	25	36,200	34,100	28,100	22,000
0.02	50	39,000	37,400	31,100	24,400
0.01	100	41,000	40,000	33,600	26,400
0.005	200	42,500	42,100	35,500	27,900

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1962 to March 1977

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	8.7	9.1	9.8	11	13	18	28	36	36
0.02	50	13	14	15	16	20	26	37	48	49
0.05	20	24	25	27	29	35	44	57	72	79
0.10	10	39	41	44	47	55	68	83	103	120
0.20	5	67	71	75	79	93	112	133	161	198
0.50	2	164	172	182	192	225	274	331	398	518
0.80	1.25	332	344	368	395	462	613	830	1,040	1,350
0.90	1.11	451	461	497	541	637	903	1,350	1,750	2,240
0.96	1.04	595	602	654	725	859	1,330	2,270	3,100	3,820
0.98	1.02	695	698	763	858	1,020	1,690	3,190	4,530	5,390
0.99	1.01	788	788	864	983	1,180	2,070	4,330	6,410	7,350

Magnitude and frequency of seasonal low discharges, based on period of record October 1961 to September 1977

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	9.8	11	12	16	44	44	46	69
0.02	50	15	16	17	22	74	78	83	119
0.05	20	26	29	31	37	152	172	184	251
0.10	10	42	46	49	59	270	319	344	457
0.20	5	74	81	86	100	499	613	670	869
0.50	2	203	217	231	268	1,270	1,610	1,820	2,340
0.80	1.25	503	531	568	694	2,450	3,010	3,590	4,750
0.90	1.11	778	817	879	1,120	3,140	3,750	4,580	6,230
0.96	1.04	1,210	1,260	1,370	1,850	3,830	4,420	5,540	7,790
0.98	1.02	1,580	1,640	1,790	2,550	4,230	4,770	6,070	8,720
0.99	1.01	1,990	2,070	2,260	3,380	4,550	5,010	6,470	9,470
		July-August-September				October-November-December			
0.01	100	37	37	39	45	17	19	21	28
0.02	50	48	49	51	58	23	26	30	39
0.05	20	69	73	76	87	37	43	49	62
0.10	10	95	101	107	123	55	66	77	93
0.20	5	137	148	157	184	89	110	130	154
0.50	2	259	289	312	386	227	288	341	396
0.80	1.25	459	521	573	772	574	743	860	1,010
0.90	1.11	602	687	765	1,090	933	1,210	1,370	1,650
0.96	1.04	789	904	1,020	1,560	1,560	2,020	2,220	2,760
0.98	1.02	929	1,070	1,210	1,940	2,180	2,810	3,010	3,850
0.99	1.01	1,070	1,230	1,410	2,360	2,940	3,770	3,940	5,180

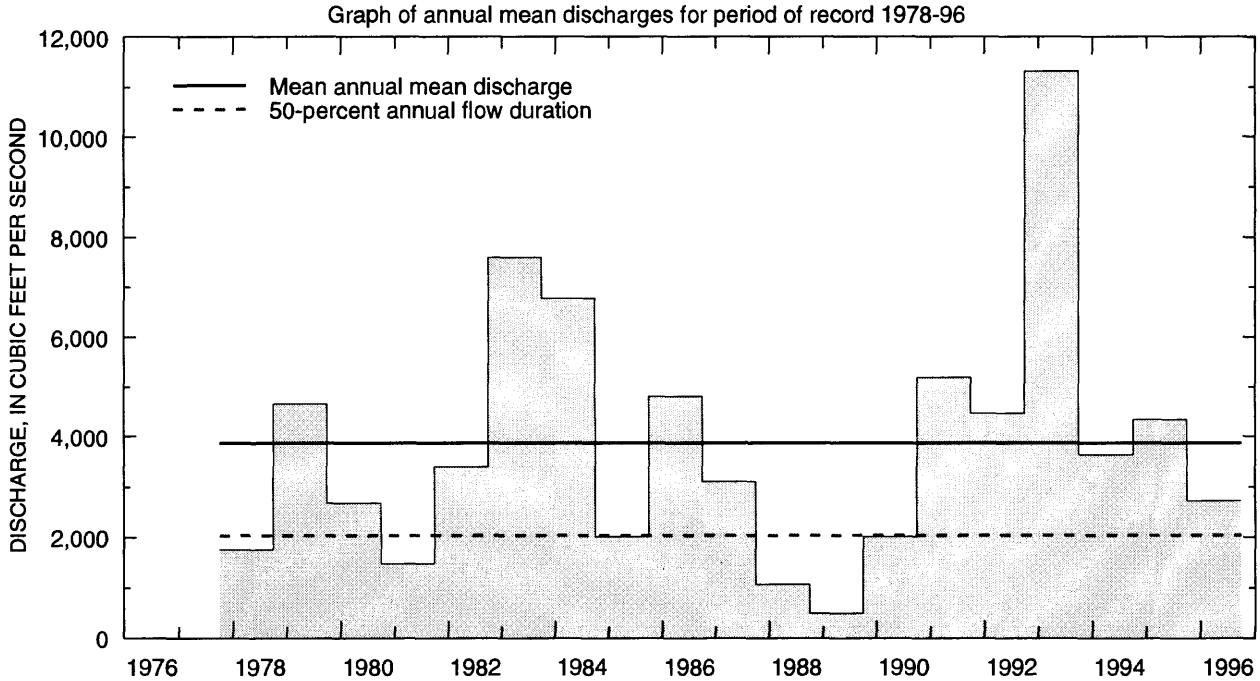
05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1978-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	7,161	1987	194	1990	2,115	1,942
November	6,210	1987	190	1990	2,293	2,034
December	5,345	1983	205	1990	1,840	1,527
January	3,605	1983	190	1991	1,038	950
February	6,589	1984	208	1978	1,561	1,828
March	13,800	1983	362	1981	4,537	3,512
April	17,790	1993	623	1989	6,688	4,933
May	18,170	1993	1,305	1989	6,381	4,996
June	19,540	1991	877	1988	7,268	5,751
July	32,820	1993	254	1988	6,682	7,182
August	15,440	1993	212	1989	3,423	3,489
September	13,450	1993	225	1988	2,492	3,335
Annual	11,320	1993	487	1989	3,869	2,598

Graph of annual mean discharges for period of record 1978-96



05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1978-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	190	185	192	180	170	165	249	463	319	200	203	201	188
95	201	198	210	190	196	206	548	784	644	268	211	217	210
90	236	230	222	195	206	378	786	1,390	1,080	553	230	264	258
85	336	440	346	206	216	717	1,290	1,700	1,470	796	348	415	432
80	480	568	510	215	225	1,110	2,190	1,980	1,980	1,250	749	542	625
75	580	653	610	252	253	1,380	2,530	2,200	2,330	2,110	1,020	605	768
70	661	729	761	300	303	1,670	2,850	2,430	2,700	2,490	1,220	640	943
60	860	1,010	1,100	565	605	2,260	3,940	3,130	3,680	3,710	1,720	925	1,400
50	1,130	1,460	1,360	800	763	3,150	5,150	4,230	5,700	4,820	2,190	1,170	2,040
40	1,620	2,040	1,600	960	981	4,190	6,610	6,040	7,430	5,850	2,820	1,660	2,800
30	2,640	2,700	2,200	1,150	1,130	5,740	9,410	8,620	9,640	7,430	3,840	1,990	4,230
25	3,150	3,260	2,440	1,260	1,330	6,590	11,200	10,500	11,100	8,370	4,560	2,320	5,070
20	3,810	4,200	2,920	1,500	1,730	7,710	12,000	12,000	11,900	9,800	4,960	2,640	6,170
15	4,290	5,130	3,320	1,720	2,260	9,770	12,700	12,600	12,400	11,500	5,790	4,170	7,890
10	5,190	5,790	4,230	2,290	3,540	12,200	14,700	13,300	14,200	12,100	7,140	6,870	11,000
5	6,020	6,620	5,190	3,050	6,950	13,800	16,600	16,800	22,200	22,400	13,300	12,600	13,400

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05481650 DES MOINES RIVER NEAR SAYLORVILLE, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1978 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	100	100	100	100	100	101	101	101	102
0.02	50	115	115	118	124	125	126	137	140	148
0.05	20	135	139	141	142	143	175	207	213	250
0.10	10	153	159	166	173	185	233	293	317	385
0.20	5	183	190	207	226	254	329	436	495	624
0.50	2	273	285	329	384	469	629	875	1,060	1,390
0.80	1.25	447	471	556	675	876	1,190	1,620	2,040	2,680
0.90	1.11	600	637	752	920	1,220	1,640	2,160	2,750	3,570
0.96	1.04	846	908	1,060	1,290	1,740	2,320	2,870	3,650	4,670
0.98	1.02	1,070	1,160	1,340	1,620	2,200	2,890	3,400	4,320	5,440
0.99	1.01	1,350	1,470	1,660	1,990	2,720	3,520	3,940	4,980	6,160

Magnitude and frequency of seasonal low discharges, based on period of record October 1977 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	77	80	82	82	119	129	179	275
0.02	50	93	95	98	98	164	185	249	368
0.05	20	123	125	129	133	263	311	404	569
0.10	10	159	161	166	179	396	488	617	834
0.20	5	216	219	228	256	642	825	1,020	1,320
0.50	2	386	409	440	522	1,560	2,130	2,550	3,120
0.80	1.25	690	791	902	1,090	3,630	5,130	6,100	7,220
0.90	1.11	934	1,130	1,340	1,630	5,540	7,890	9,450	11,100
0.96	1.04	1,290	1,680	2,100	2,510	8,570	12,300	14,900	17,500
0.98	1.02	1,590	2,190	2,820	3,330	11,300	16,100	19,800	23,400
0.99	1.01	1,910	2,780	3,720	4,320	14,400	20,400	25,500	30,200
		July-August-September				October-November-December			
0.01	100	137	169	169	177	96	106	109	111
0.02	50	142	177	183	202	112	125	136	146
0.05	20	153	194	213	252	142	163	189	217
0.10	10	169	219	251	317	176	209	255	307
0.20	5	204	269	324	433	232	288	369	464
0.50	2	367	490	630	895	400	558	758	999
0.80	1.25	966	1,250	1,600	2,210	719	1,160	1,600	2,090
0.90	1.11	1,910	2,360	2,910	3,820	991	1,760	2,380	3,030
0.96	1.04	4,550	5,270	6,080	7,270	1,410	2,800	3,670	4,480
0.98	1.02	8,650	9,500	10,300	11,400	1,790	3,820	4,880	5,730
0.99	1.01	16,300	16,900	17,200	17,500	2,220	5,110	6,320	7,130

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05481950 BEAVER CREEK NEAR GRIMES, IOWA

LOCATION.—Lat 41°41'18", long 93°44'06", in SW1/4 SW1/4 sec. 35, T80N, R25W, Polk County, Hydrologic Unit 07100004, on left bank 10 ft upstream from bridge on Northwest 70th Avenue, 0.5 mi downstream from Little Beaver Creek, 2.5 mi east of Grimes, and 6 mi upstream from mouth.

DRAINAGE AREA.—358 mi^2.

PERIOD OF RECORD.—April 1960 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 806.98 ft above sea level. Prior to August 31, 1966, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 14,300 ft^3/s, July 10, 1993, gage height, 16.58 ft; no flow September 8, 11-13, 1970, September 17-18, October 7-17, 1971, many days during 1977.

Selected values from rating table number 13, developed October 1987

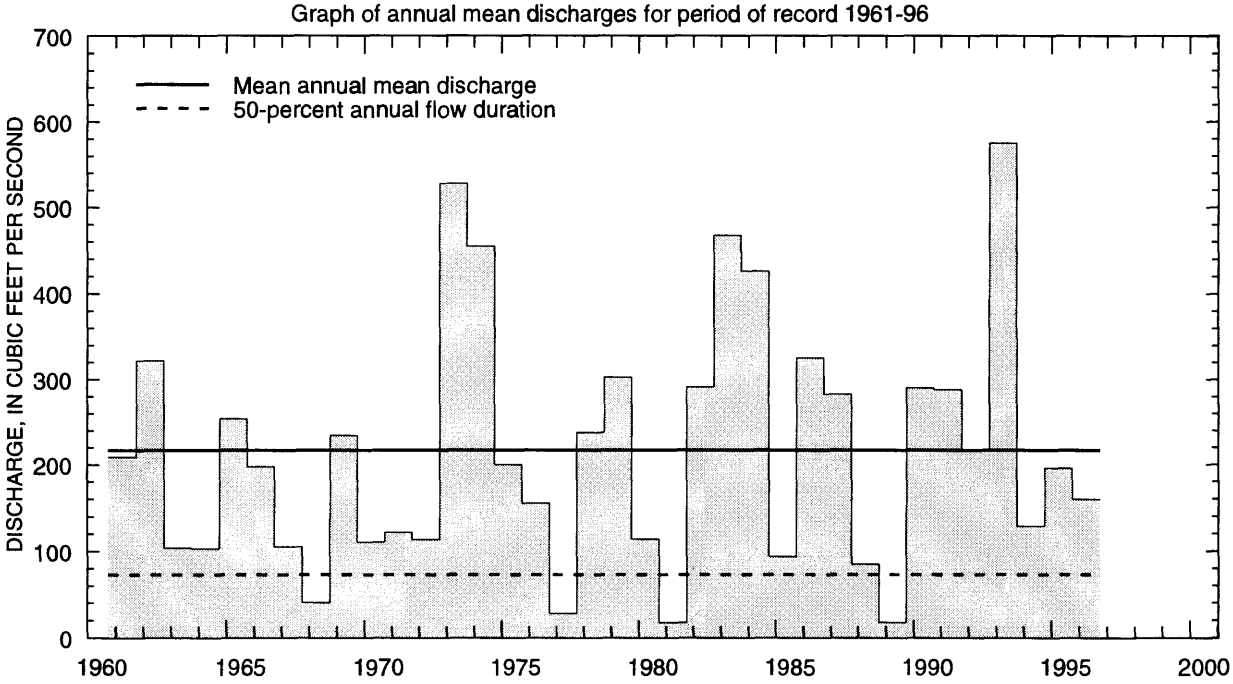
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	0.50	8.0	1,060
4.0	65.0	10.0	1,900
5.0	216	12.0	3,380
6.0	438	15.0	8,200
7.0	721	18.0	19,500

05481950 BEAVER CREEK NEAR GRIMES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1961-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	724	1974	0.058	1989	108	185
November	655	1973	0.63	1967	121	154
December	486	1983	0.77	1977	103	126
January	305	1974	0.002	1977	63.1	85.3
February	526	1973	0.35	1977	123	149
March	1,171	1979	3.98	1981	362	322
April	1,275	1965	3.26	1981	381	365
May	1,419	1974	1.11	1981	422	353
June	1,201	1990	1.41	1977	444	343
July	2,160	1993	0.24	1977	276	411
August	695	1993	0.73	1988	114	151
September	654	1993	0.26	1988	79.1	142
Annual	575	1993	17.3	1981	217	143

Graph of annual mean discharges for period of record 1961-96



05481950 BEAVER CREEK NEAR GRIMES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1961-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.20	0.07	0.00	0.01	2.0	2.7	0.43	0.12	0.00	0.02	0.04	0.04
95	0.11	0.86	0.60	0.40	0.70	5.0	5.4	3.3	6.0	1.2	0.23	0.20	0.60
90	0.43	2.7	1.0	0.70	1.2	12	12	16	33	7.9	1.1	0.47	1.9
85	1.2	3.9	2.1	1.1	2.3	20	43	49	56	14	3.0	0.76	4.2
80	2.4	6.0	2.9	2.2	6.6	50	70	66	78	22	4.8	1.6	7.9
75	4.0	8.3	6.7	3.6	13	65	81	90	103	33	6.8	2.5	13
70	6.0	13	11	5.8	18	90	93	123	130	43	9.4	4.5	19
60	14	31	22	15	27	150	134	197	190	68	17	8.3	40
50	20	54	40	24	38	191	202	252	268	102	29	15	73
40	41	83	70	35	62	254	308	329	367	152	44	25	119
30	71	130	115	72	94	375	415	416	477	229	79	42	193
25	104	158	141	92	110	445	488	486	554	276	103	53	245
20	143	194	180	108	142	530	568	608	651	341	138	82	318
15	217	245	230	127	210	654	691	786	800	429	192	124	406
10	329	342	277	160	348	870	888	1,050	1,040	645	292	221	559
5	466	510	381	241	560	1,300	1,450	1,530	1,430	1,060	583	368	898

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 37 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	520
0.95	1.05	858
0.90	1.11	1,110
0.80	1.25	1,520
0.50	2	2,700
0.20	5	4,680
0.10	10	6,180
0.04	25	8,260
0.02	50	9,920
0.01	100	11,700
0.005	200	13,500

Magnitude and frequency of annual high discharges, based on period of record 1961-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	280	180	129	84
0.95	1.05	512	357	260	181
0.90	1.11	697	502	366	262
0.80	1.25	1,000	741	538	393
0.50	2	1,930	1,460	1,040	767
0.20	5	3,560	2,650	1,810	1,310
0.10	10	4,810	3,510	2,330	1,640
0.04	25	6,540	4,620	2,960	2,020
0.02	50	7,930	5,450	3,410	2,270
0.01	100	9,380	6,280	3,840	2,490
0.005	200	10,900	7,090	4,250	2,690

05481950 BEAVER CREEK NEAR GRIMES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1961 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.07	0.15	0.20
0.02	50	0.00	0.00	0.00	0.00	0.00	0.06	0.14	0.29	0.41
0.05	20	0.00	0.00	0.00	0.00	0.04	0.18	0.39	0.77	1.1
0.10	10	0.00	0.00	0.01	0.02	0.17	0.45	0.95	1.8	2.5
0.20	5	0.06	0.09	0.18	0.26	0.62	1.3	2.6	4.5	6.6
0.50	2	1.3	1.6	2.2	3.0	4.8	8.2	15	22	33
0.80	1.25	10	11	13	18	26	43	66	90	130
0.90	1.11	24	26	30	39	59	93	132	170	243
0.96	1.04	55	57	64	83	130	201	260	315	443
0.98	1.02	89	92	102	131	210	322	390	455	631
0.99	1.01	134	139	153	192	318	481	548	619	847

Magnitude and frequency of seasonal low discharges, based on period of record July 1960 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.50
0.02	50	0.00	0.00	0.00	0.00	0.00	0.08	0.22	1.3
0.05	20	0.02	0.08	0.20	0.33	0.37	0.64	1.3	4.3
0.10	10	0.16	0.35	0.66	1.1	2.3	3.1	4.8	11
0.20	5	0.88	1.4	2.1	3.2	11	14	18	32
0.50	2	9.7	11	13	18	70	100	113	145
0.80	1.25	53	56	59	76	205	246	301	391
0.90	1.11	105	116	121	150	285	298	393	551
0.96	1.04	191	230	248	292	357	400	459	713
0.98	1.02	263	344	384	438	392	420	485	803
0.99	1.01	337	481	561	620	416	450	499	870
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.03
0.02	50	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.08
0.05	20	0.00	0.02	0.05	0.27	0.00	0.03	0.04	0.29
0.10	10	0.01	0.10	0.18	0.66	0.07	0.17	0.23	0.81
0.20	5	0.18	0.41	0.69	1.8	0.46	0.76	1.1	2.6
0.50	2	2.5	3.6	5.4	11	5.6	7.4	11	18
0.80	1.25	17	22	30	53	37	44	60	89
0.90	1.11	41	52	67	114	85	97	128	179
0.96	1.04	95	121	147	243	186	205	253	346
0.98	1.02	158	201	236	385	296	317	374	506
0.99	1.01	245	310	354	571	438	456	513	690

05482000 DES MOINES RIVER AT 2ND AVENUE, DES MOINES, IOWA

LOCATION.—Lat 41°36'45", long 93°37'15", in NE1/4 NE1/4 sec. 34, T79N, R24W, Polk County, Hydrologic Unit 07100004, on right bank 5 ft upstream from Second Avenue bridge in Des Moines, 1.8 mi upstream from Center Street Dam, 2.8 mi upstream from Raccoon River and 4.5 mi downstream from Beaver Creek.

DRAINAGE AREA.—6,245 mi^2.

PERIOD OF RECORD.—May 1905 to July 1906, March 1915 to September 1961 (discontinued).

GAGE.—Water-stage recorder and concrete multiple arch control dam. Datum of gage is 773.68 ft above sea level and at city datum. Prior to August 21, 1941, staff, chain, or recording gages at several sites within 3 mi of present site, at various datums.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 60,200 ft^3/s, June 24, 1954, gage height, 30.16 ft; minimum daily discharge, 24 ft^3/s, January 29, 30, 1940.

REMARKS.—Gage reactivated October 1996. Flow regulated since April 12, 1977, by dam at Saylorville Lake (station 05481630) 6.8 mi upstream.

Selected values from rating table number 3, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
13.0	460	18.0	11,600
13.5	1,210	20.0	17,200
14.0	2,080	22.0	23,400
15.0	4,450	24.0	30,100
16.0	6,660	27.0	40,900
17.0	9,040	30.0	52,500

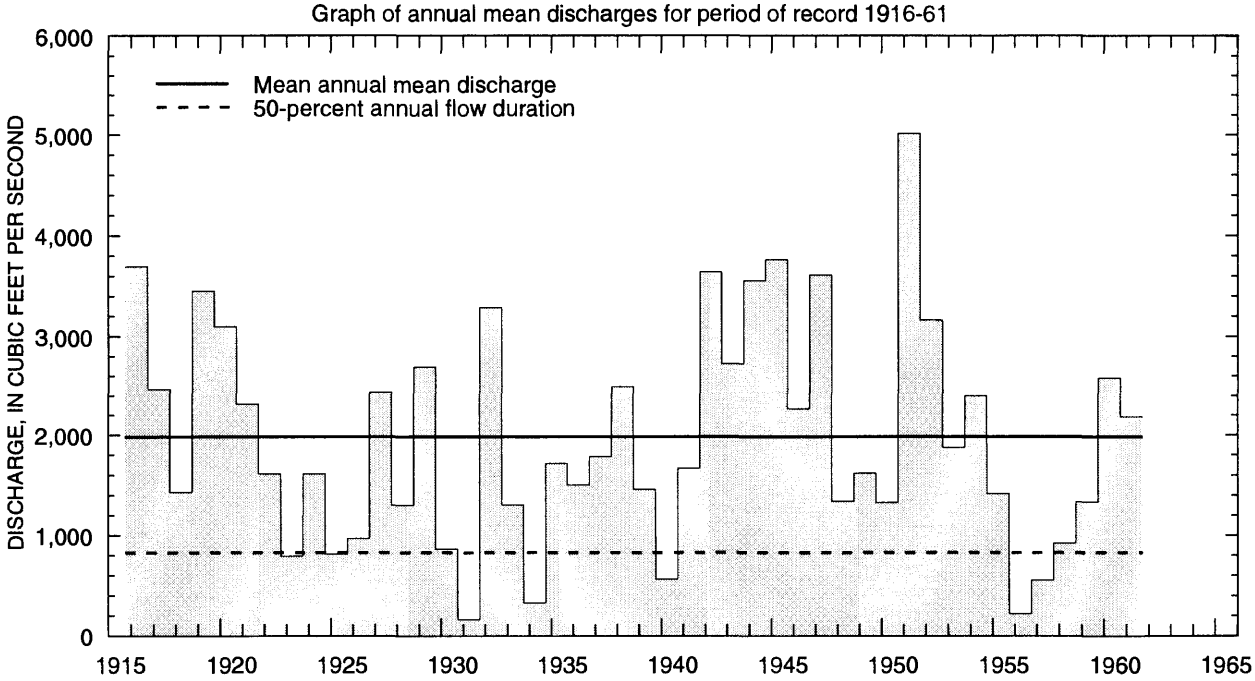
05482000 DES MOINES RIVER AT 2ND AVENUE, DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1916-61

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	5,196	1916	67.3	1957	908	1,066
November	6,215	1942	78.7	1956	945	1,193
December	2,511	1942	57.6	1956	589	618
January	5,286	1932	34.9	1940	593	926
February	3,917	1916	55.1	1940	1,080	996
March	9,424	1932	123	1931	3,657	2,542
April	19,190	1951	213	1931	4,095	3,630
May	14,170	1944	165	1931	3,255	2,720
June	15,750	1947	198	1931	4,188	3,663
July	9,527	1951	175	1926	2,236	2,151
August	4,135	1943	65.4	1931	1,146	1,140
September	8,719	1938	52.6	1930	1,108	1,532
Annual	5,012	1951	158	1931	1,984	1,111

Graph of annual mean discharges for period of record 1916-61



05482000 DES MOINES RIVER AT 2ND AVENUE, DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1916-61

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	62	72	57	30	38	107	185	141	97	80	50	50	54
95	93	97	74	55	64	165	413	265	264	157	88	70	91
90	121	128	93	66	85	312	675	420	534	262	150	110	130
85	142	150	116	90	105	498	885	645	688	347	210	156	170
80	168	183	140	100	136	769	1,070	914	860	467	255	198	218
75	186	212	150	115	162	945	1,340	1,130	1,110	599	305	237	276
70	210	262	170	130	200	1,240	1,640	1,340	1,300	744	350	265	352
60	271	348	230	170	308	1,940	2,140	1,760	1,920	985	449	325	544
50	410	479	349	220	505	2,500	2,710	2,320	2,630	1,270	560	442	828
40	573	571	459	318	730	3,110	3,450	2,900	3,380	1,750	735	615	1,260
30	874	833	598	489	1,100	4,000	4,470	3,720	4,570	2,380	1,040	915	1,970
25	1,120	1,020	700	615	1,350	4,680	5,180	4,210	5,320	2,800	1,300	1,120	2,430
20	1,410	1,370	864	750	1,640	5,650	5,910	4,810	6,210	3,270	1,730	1,410	3,030
15	1,820	1,680	1,130	930	2,030	6,610	7,060	5,680	7,710	4,020	2,280	1,920	3,760
10	2,460	2,320	1,460	1,240	2,760	8,900	9,050	6,810	9,590	4,910	3,050	2,800	5,040
5	3,580	3,560	2,180	2,100	3,950	12,400	12,400	9,030	13,000	7,220	4,150	4,060	7,530

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 54 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	4,490
0.90	1.11	5,940
0.80	1.25	8,210
0.50	2	14,600
0.20	5	24,700
0.10	10	31,800
0.04	25	41,100
0.02	50	48,100
0.01	100	55,100
0.005	200	62,100

Magnitude and frequency of annual high discharges, based on period of record 1916-61

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,290	1,110	799	501
0.95	1.05	2,910	2,550	1,940	1,360
0.90	1.11	4,280	3,770	2,920	2,130
0.80	1.25	6,560	5,790	4,560	3,430
0.50	2	13,200	11,500	9,100	6,980
0.20	5	22,800	19,500	15,000	11,200
0.10	10	28,800	24,200	18,300	13,300
0.04	25	35,600	29,300	21,600	15,100
0.02	50	40,100	32,500	23,500	16,100
0.01	100	44,000	35,300	25,100	16,800
0.005	200	47,600	37,600	26,300	17,300

05482000 DES MOINES RIVER AT 2ND AVENUE, DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1915 to March 1961

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	22	23	25	27	30	38	44	48	51
0.02	50	25	27	29	32	36	44	53	59	67
0.05	20	32	34	36	40	46	58	71	81	98
0.10	10	40	42	45	51	59	75	93	109	138
0.20	5	54	57	61	68	80	103	132	157	210
0.50	2	102	107	115	128	154	203	266	326	468
0.80	1.25	212	221	238	262	320	435	569	708	1,040
0.90	1.11	323	338	363	396	486	668	866	1,080	1,590
0.96	1.04	521	547	587	633	779	1,090	1,380	1,730	2,490
0.98	1.02	722	762	815	870	1,070	1,510	1,890	2,360	3,340
0.99	1.01	979	1,040	1,110	1,170	1,440	2,040	2,510	3,130	4,330

Magnitude and frequency of seasonal low discharges, based on period of record March 1915 to September 1961

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	21	23	25	28	47	58	66	101
0.02	50	25	28	31	34	73	88	100	148
0.05	20	35	39	42	47	133	157	179	254
0.10	10	46	52	57	63	217	253	289	399
0.20	5	67	76	82	94	375	431	493	663
0.50	2	144	164	178	214	922	1,040	1,200	1,570
0.80	1.25	330	377	418	549	1,890	2,120	2,470	3,260
0.90	1.11	524	598	674	938	2,570	2,890	3,400	4,520
0.96	1.04	876	998	1,150	1,720	3,410	3,850	4,570	6,190
0.98	1.02	1,240	1,410	1,640	2,600	3,990	4,530	5,400	7,440
0.99	1.01	1,700	1,930	2,290	3,830	4,540	5,170	6,200	8,670
		July-August-September				October-November-December			
0.01	100	31	33	35	41	28	40	45	48
0.02	50	38	40	44	52	33	46	51	57
0.05	20	51	55	61	75	43	58	64	74
0.10	10	68	75	84	104	56	72	80	95
0.20	5	98	110	125	158	77	97	107	131
0.50	2	214	246	282	370	150	183	204	264
0.80	1.25	520	596	687	922	314	383	436	592
0.90	1.11	863	981	1,130	1,530	474	589	679	942
0.96	1.04	1,530	1,710	1,960	2,670	752	965	1,130	1,600
0.98	1.02	2,270	2,490	2,830	3,870	1,030	1,350	1,600	2,300
0.99	1.01	3,260	3,530	3,980	5,440	1,370	1,860	2,230	3,220

05482135 NORTH RACCOON RIVER NEAR NEWELL, IOWA

LOCATION.—Lat 42°36'16", long 95°02'42", in NE1/4 NW1/4 sec. 24, T90N, R36W, Buena Vista County, Hydrologic Unit 07100006, on left bank 40 ft downstream from bridge on State Highway 7, 0.8 mi upstream from Outlet Creek, 2.2 mi west of Newell, and at mile 398.6 from mouth of Des Moines River.

DRAINAGE AREA.—233 mi^2.

PERIOD OF RECORD.—October 1982 to September 1995 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1235.50 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 2,850 ft^3/s, June 17, 1984, gage height, 16.73 ft, from flood mark; minimum daily discharge, 0.07 ft^3/s, December 22–24, 1989.

Selected values from rating table number 5, developed October 1987
(A discharge measurement to validate this rating has not been made since October 1995)

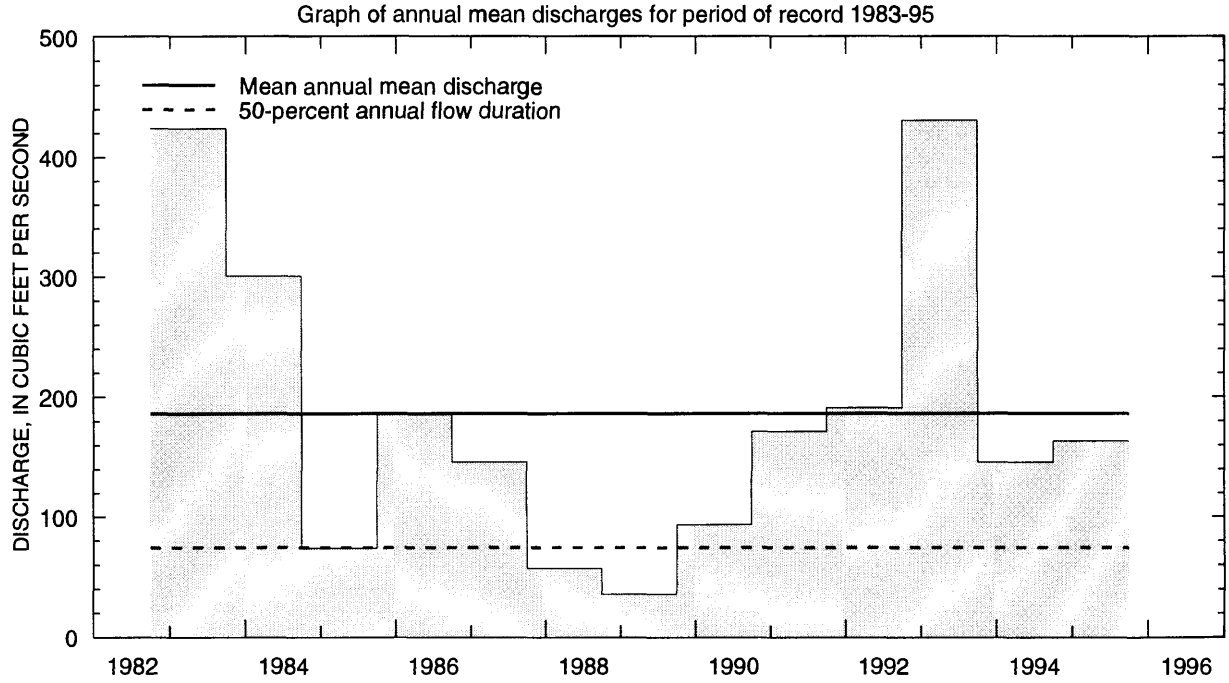
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.5	1.50	10.0	244
8.0	12.9	11.0	410
8.5	48.6	12.0	606
9.0	108	14.0	1,120
9.5	173	16.5	2,700

05482135 NORTH RACCOON RIVER NEAR NEWELL, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1983-95

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	602	1983	4.10	1990	139	177
November	271	1984	2.54	1990	99.5	98.8
December	229	1983	0.40	1990	79.9	66.2
January	168	1992	0.98	1990	47.2	49.0
February	291	1984	2.13	1990	95.9	105
March	825	1983	17.0	1990	251	220
April	905	1993	15.4	1990	366	287
May	631	1991	70.1	1989	319	205
June	1,277	1984	38.5	1989	461	402
July	1,092	1993	9.78	1989	231	295
August	371	1993	2.17	1989	76.3	94.3
September	192	1986	5.71	1984	65.6	66.2
Annual	431	1993	35.7	1989	186	127

Graph of annual mean discharges for period of record 1983-95



05482135 NORTH RACCOON RIVER NEAR NEWELL, IOWA—Continued

Monthly and annual flow durations, based on period of record 1983-95

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	3.2	0.97	0.08	0.43	1.7	3.8	9.0	6.5	17	3.5	1.2	3.9	0.86
95	3.9	3.0	0.52	1.0	2.2	19	16	30	27	6.7	2.2	5.1	4.1
90	4.2	4.7	5.4	3.3	5.5	30	41	63	48	11	3.2	6.0	7.3
85	4.4	5.9	19	4.6	11	45	59	79	64	19	7.2	6.8	14
80	5.1	15	26	16	13	55	84	92	82	27	9.8	7.3	21
75	18	24	29	20	14	64	95	108	98	34	13	8.9	28
70	26	36	35	24	16	77	130	134	115	45	18	10	33
60	42	43	45	29	29	97	177	187	159	70	26	16	50
50	60	64	62	32	37	125	228	253	211	99	34	21	74
40	92	75	74	36	49	179	310	304	341	133	44	29	108
30	125	111	90	43	60	256	414	365	452	189	57	51	163
25	157	141	100	47	72	301	492	402	574	230	69	86	202
20	190	179	119	52	114	355	603	467	717	287	92	106	260
15	232	201	136	82	209	418	730	553	968	354	127	130	340
10	333	262	151	115	273	564	883	714	1,400	551	170	177	461
5	616	325	200	167	450	940	1,190	886	1,800	1,100	284	268	785

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 12 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	319
0.95	1.05	534
0.90	1.11	690
0.80	1.25	924
0.50	2	1,530
0.20	5	2,380
0.10	10	2,920
0.04	25	3,570
0.02	50	4,030
0.01	100	4,460
0.005	200	4,860

Magnitude and frequency of annual high discharges, based on period of record 1983-95

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	137	83	54	36
0.95	1.05	293	190	129	95
0.90	1.11	422	283	196	151
0.80	1.25	632	443	314	250
0.50	2	1,230	944	693	559
0.20	5	2,090	1,770	1,340	1,030
0.10	10	2,620	2,340	1,790	1,310
0.04	25	3,240	3,050	2,360	1,630
0.02	50	3,640	3,550	2,770	1,830
0.01	100	4,100	4,030	3,160	2,000
0.005	200	4,600	4,480	3,530	2,150

05482135 NORTH RACCOON RIVER NEAR NEWELL, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1983 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.02	0.02	0.02	0.03	0.10	0.20	0.35	0.49	1.2
0.02	50	0.05	0.05	0.06	0.08	0.22	0.43	0.72	1.0	2.2
0.05	20	0.21	0.21	0.24	0.32	0.62	1.2	1.9	2.7	4.8
0.10	10	0.61	0.64	0.72	0.90	1.4	2.6	4.1	5.8	9.2
0.20	5	1.8	2.0	2.2	2.6	3.5	5.9	9.2	13	18
0.50	2	8.4	9.1	10	12	14	20	29	39	53
0.80	1.25	20	22	24	29	34	42	61	78	110
0.90	1.11	25	28	31	38	49	55	78	97	145
0.96	1.04	30	32	36	45	64	66	92	113	182
0.98	1.02	31	34	38	48	73	75	100	120	203
0.99	1.01	33	35	39	51	81	90	105	125	220

Magnitude and frequency of seasonal low discharges, based on period of record October 1982 to September 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.03	0.12	0.19	0.37	2.4	3.0	5.3	7.3
0.02	50	0.11	0.30	0.43	0.72	3.9	4.8	8.1	11
0.05	20	0.51	0.99	1.2	1.8	7.8	9.4	15	21
0.10	10	1.6	2.5	2.9	3.7	14	16	24	36
0.20	5	5.1	6.4	6.9	8.2	26	30	41	63
0.50	2	23	24	26	28	70	81	101	158
0.80	1.25	51	54	60	67	153	180	216	323
0.90	1.11	61	69	80	94	212	253	302	436
0.96	1.04	68	81	101	125	285	347	416	571
0.98	1.02	70	86	111	145	335	414	499	664
0.99	1.01	71	90	119	162	381	477	581	747
		July-August-September				October-November-December			
0.01	100	0.58	0.72	0.93	0.94	0.02	0.02	0.03	0.11
0.02	50	0.78	0.96	1.2	1.3	0.06	0.06	0.10	0.28
0.05	20	1.2	1.5	1.9	2.2	0.33	0.38	0.51	1.0
0.10	10	1.9	2.3	2.8	3.4	1.2	1.4	1.7	2.9
0.20	5	3.1	3.7	4.5	5.9	4.5	5.4	6.1	8.2
0.50	2	8.5	10	12	17	25	30	33	37
0.80	1.25	25	29	35	51	56	69	82	96
0.90	1.11	44	51	63	91	68	84	106	130
0.96	1.04	82	94	119	169	76	93	123	161
0.98	1.02	124	140	183	255	78	96	130	176
0.99	1.01	181	202	271	369	79	98	134	187

05482170 BIG CEDAR CREEK NEAR VARINA, IOWA

LOCATION.—Lat 42°41'16", long 94°47'52", in NE1/4 NE1/4 sec. 24, T91N, R34W, Pocahontas County, Hydrologic Unit 07100006, on left bank 2 ft downstream from bridge on County Highway N33, 2.0 mi downstream from Drainage Ditch 21, 3.5 mi upstream from Drainage Ditch 74 and 5.5 mi northeast of Varina.

DRAINAGE AREA.—80.0 mi^2.

PERIOD OF RECORD.—October 1959 to March 1992.

GAGE.—Water-stage recorder. Datum of gage is 1225.12 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 2,080 ft^3/s, August 31, 1962, gage height, 13.68 ft; maximum gage height, 16.29 ft, March 24, 1979, backwater from ice; no flow many days during period of record.

Selected values from rating table number 7, developed November 1973
(A discharge measurement to validate this rating has not been made since February 1992)

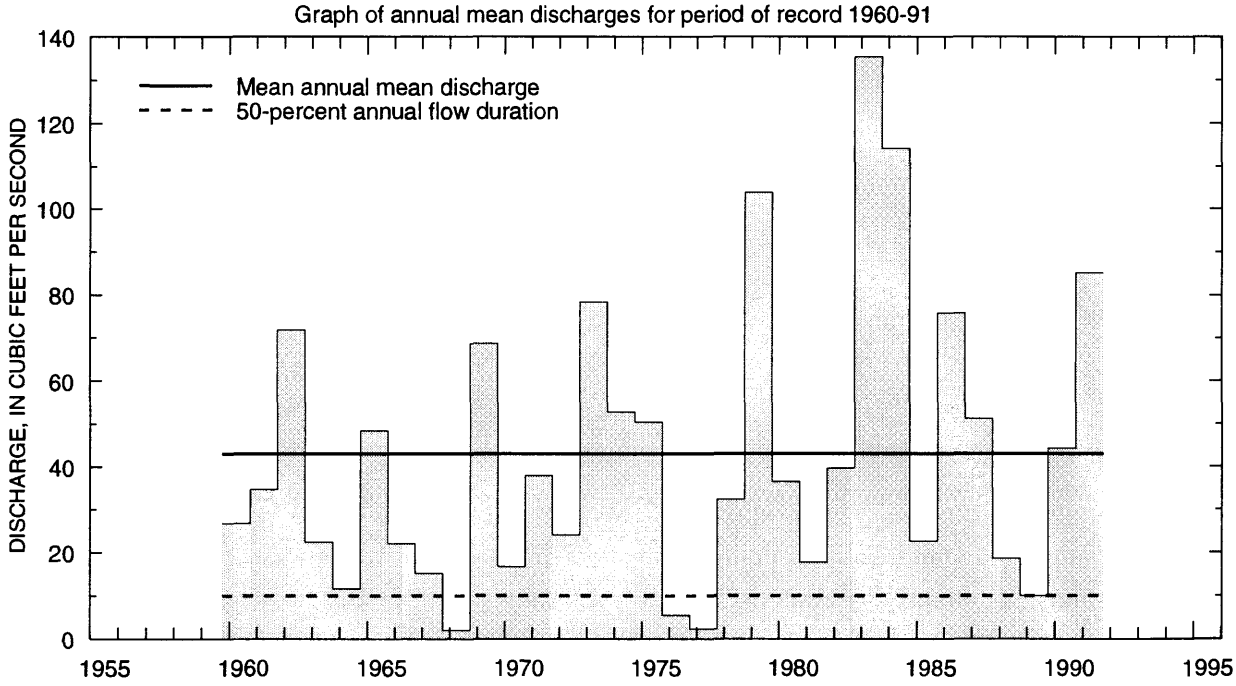
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	6.51	8.0	619
3.0	26.2	10.0	1,040
4.0	92.0	12.0	1,550
5.0	184	14.0	2,140
6.0	303	16.0	2,820

05482170 BIG CEDAR CREEK NEAR VARINA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1960-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	211	1983	0.40	1977	29.6	49.0
November	119	1974	0.12	1977	22.4	32.0
December	90.7	1983	0.000	1977	12.2	17.8
January	35.5	1983	0.000	1977	6.04	8.58
February	279	1984	0.000	1975	20.6	52.4
March	582	1979	1.82	1975	86.0	119
April	352	1975	1.08	1967	95.0	98.9
May	262	1991	0.65	1977	66.8	63.8
June	426	1984	0.37	1977	82.6	99.6
July	203	1962	0.29	1977	39.8	50.1
August	178	1979	0.44	1976	24.1	38.1
September	240	1962	0.45	1976	31.1	51.8
Annual	135	1983	1.89	1968	43.1	33.6

Graph of annual mean discharges for period of record 1960-91



05482170 BIG CEDAR CREEK NEAR VARINA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1960-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.21	0.05	0.00	0.00	0.00	0.00	0.39	0.37	0.23	0.18	0.10	0.23	0.00
95	0.37	0.24	0.00	0.00	0.00	0.26	1.1	0.90	1.3	1.1	0.36	0.40	0.04
90	0.48	0.49	0.01	0.00	0.00	1.4	3.5	5.6	7.9	2.3	0.69	0.52	0.43
85	0.54	0.71	0.28	0.00	0.00	2.4	7.1	9.0	11	3.2	1.1	0.64	0.80
80	0.73	1.2	0.60	0.00	0.01	3.8	9.6	13	14	4.2	1.4	0.82	1.4
75	1.2	1.8	1.1	0.06	0.12	4.5	12	16	16	5.1	1.8	1.2	2.2
70	1.8	2.5	1.9	0.30	0.46	6.2	15	19	18	6.2	2.3	1.6	3.3
60	3.3	4.5	3.4	0.90	1.5	12	29	26	24	9.2	3.1	2.6	5.8
50	6.4	7.0	5.2	2.2	3.3	20	44	36	30	13	4.3	4.0	10
40	16	14	8.2	4.0	5.0	32	62	47	40	19	6.6	6.5	16
30	24	19	12	6.8	7.6	48	89	66	59	29	9.8	13	27
25	29	22	14	8.6	9.3	63	106	82	72	36	12	16	35
20	36	32	16	10	11	89	136	99	94	46	16	26	47
15	50	45	21	13	15	136	176	121	130	60	26	42	65
10	80	59	31	17	22	215	268	158	206	101	43	69	102
5	129	96	44	22	64	400	398	234	373	179	97	167	195

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 32 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	129
0.90	1.11	192
0.80	1.25	303
0.50	2	660
0.20	5	1,290
0.10	10	1,750
0.04	25	2,350
0.02	50	2,800
0.01	100	3,250
0.005	200	3,690

Magnitude and frequency of annual high discharges, based on period of record 1960-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	16	11	7.2	4.5
0.95	1.05	50	34	23	15
0.90	1.11	86	60	39	27
0.80	1.25	157	110	73	50
0.50	2	414	301	200	138
0.20	5	878	661	453	305
0.10	10	1,200	921	646	424
0.04	25	1,600	1,240	896	570
0.02	50	1,870	1,470	1,080	671
0.01	100	2,110	1,670	1,250	763
0.005	200	2,340	1,860	1,420	846

05482170 BIG CEDAR CREEK NEAR VARINA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1960 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.10
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.24
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.21	0.51
0.20	5	0.00	0.00	0.00	0.00	0.00	0.11	0.43	0.61	1.2
0.50	2	0.42	0.47	0.55	0.74	0.91	1.2	2.7	3.6	5.6
0.80	1.25	2.3	2.6	2.8	3.3	4.8	7.0	11	15	22
0.90	1.11	4.3	4.6	5.0	5.7	8.4	15	20	28	43
0.96	1.04	7.3	7.6	8.1	8.9	13	31	37	50	83
0.98	1.02	9.8	9.9	11	11	16	47	55	70	125
0.99	1.01	13	13	13	14	19	68	77	92	177

Magnitude and frequency of seasonal low discharges, based on period of record October 1959 to December 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.07	0.10	0.17	0.23
0.02	50	0.00	0.00	0.00	0.00	0.15	0.22	0.35	0.48
0.05	20	0.00	0.00	0.00	0.00	0.45	0.62	0.90	1.3
0.10	10	0.00	0.00	0.00	0.00	1.1	1.4	1.9	2.8
0.20	5	0.00	0.00	0.00	0.01	2.7	3.4	4.5	6.5
0.50	2	0.96	1.1	1.2	1.2	11	13	16	24
0.80	1.25	4.9	5.3	5.9	7.4	27	34	42	62
0.90	1.11	8.7	9.2	10	15	38	48	60	89
0.96	1.04	14	14	15	26	50	64	82	120
0.98	1.02	18	18	20	35	56	73	96	140
0.99	1.01	23	23	24	45	61	81	108	156
		July-August-September				October-November-December			
0.01	100	0.03	0.05	0.08	0.13	0.00	0.00	0.00	0.00
0.02	50	0.05	0.07	0.11	0.18	0.00	0.00	0.00	0.00
0.05	20	0.10	0.14	0.20	0.31	0.00	0.00	0.00	0.00
0.10	10	0.18	0.25	0.33	0.49	0.00	0.00	0.00	0.10
0.20	5	0.36	0.49	0.59	0.87	0.14	0.28	0.40	0.54
0.50	2	1.2	1.6	1.8	2.7	1.6	2.3	2.7	4.1
0.80	1.25	3.6	4.4	5.3	8.9	7.2	8.4	9.4	15
0.90	1.11	5.9	7.3	9.2	17	14	16	17	24
0.96	1.04	9.9	12	16	34	26	28	31	35
0.98	1.02	13	16	24	54	38	40	45	47
0.99	1.01	18	21	33	82	53	56	64	70

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IOWA

LOCATION.—Lat 42°21'16", long 94°59'26", in NW1/4 NW1/4 sec. 13, T87N, R36W, Sac County, Hydrologic Unit 07100006, on right bank 5 ft downstream from bridge on county highway, 2.1 mi upstream from Indian Creek, 0.3 mi upstream from Drainage Ditch 73, 4.6 mi south of Sac City, 167.1 miles from mouth of Raccoon River, and at mile 367.6 from mouth of Des Moines River.

DRAINAGE AREA.—700 mi^2.

PERIOD OF RECORD.—June 1958 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,146.03 ft above sea level. Prior to October 1, 1987 at site 1.7 mi downstream at datum 1.43 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 13,100 ft^3/s, March 23, 1979, gage height, 18.02 ft; maximum gage height, 20.14 ft, June 17, 1990; no flow January 30–February 4, 1977.

Selected values from rating table number 10, developed March 1994

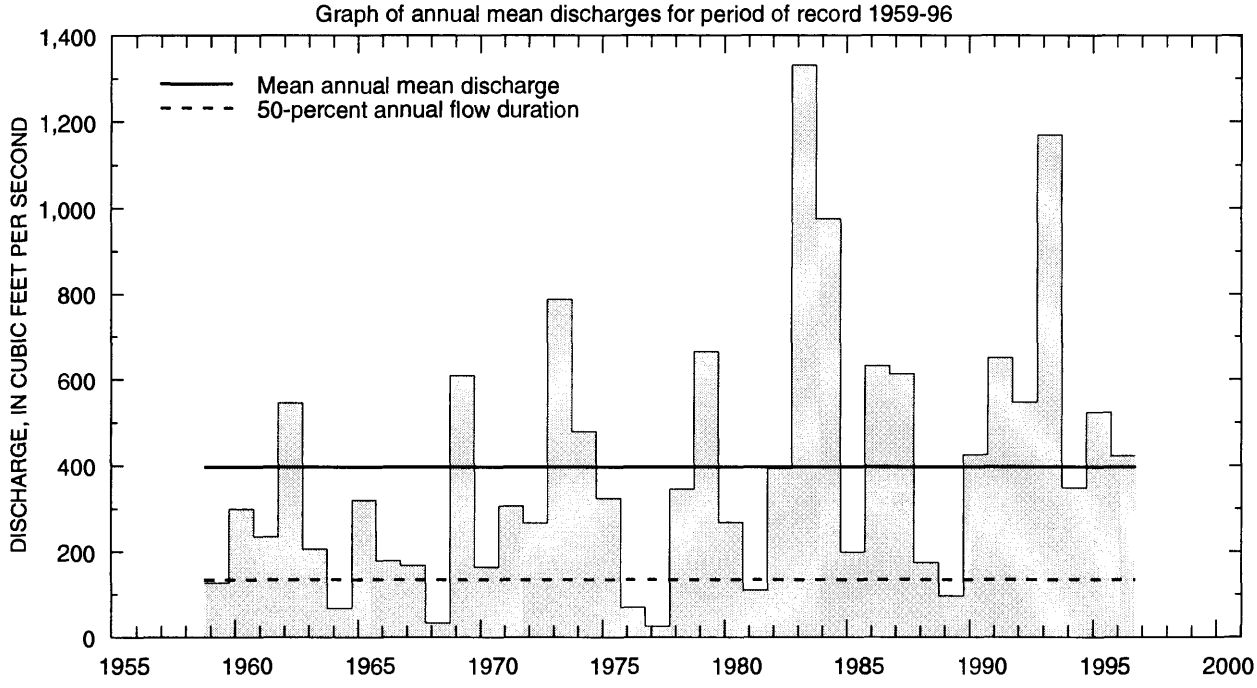
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	14.5	14.0	3,000
7.0	130	16.0	4,800
8.0	359	18.0	7,050
10.0	993	20.0	9,740
12.0	1,800	22.0	12,900

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,782	1983	6.39	1959	258	392
November	1,005	1984	9.44	1959	220	279
December	641	1983	4.39	1959	138	146
January	498	1983	0.87	1977	96.0	119
February	1,038	1984	1.16	1959	173	245
March	2,723	1983	27.2	1968	651	670
April	2,726	1983	25.6	1967	772	765
May	2,077	1991	31.9	1967	641	543
June	3,344	1984	24.7	1977	830	813
July	3,096	1993	23.0	1977	498	622
August	1,188	1993	9.29	1976	235	301
September	1,966	1962	7.80	1976	249	396
Annual	1,331	1983	25.3	1977	397	304

Graph of annual mean discharges for period of record 1959-96



05482300 NORTH RACCOON RIVER NEAR SAC CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	5.4	8.1	3.1	0.48	1.0	12	18	13	12	12	7.7	4.7	3.4
95	8.0	10	5.0	2.2	5.9	22	35	33	50	21	11	9.9	10
90	11	14	8.2	5.6	10	32	60	82	91	32	15	14	15
85	16	19	12	9.0	14	41	76	113	118	40	18	19	22
80	23	25	16	11	16	51	96	148	151	49	23	23	31
75	28	33	24	14	19	70	138	168	180	58	28	28	40
70	36	47	38	17	24	86	180	195	216	74	33	31	51
60	51	68	62	27	42	151	271	273	281	115	46	42	84
50	78	107	80	45	50	240	391	374	388	183	71	59	134
40	136	146	100	80	80	390	541	497	529	290	109	96	200
30	225	190	157	110	139	549	768	707	766	449	163	153	310
25	273	218	190	130	160	690	926	834	940	549	213	184	398
20	332	305	230	165	192	882	1,150	1,000	1,190	688	271	238	510
15	446	460	287	200	249	1,120	1,480	1,240	1,510	889	357	347	695
10	664	604	350	234	350	1,610	2,150	1,570	2,110	1,230	559	503	1,010
5	1,110	935	455	320	712	2,770	3,120	2,190	3,310	2,110	985	987	1,720

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 38 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	308
0.95	1.05	731
0.90	1.11	1,110
0.80	1.25	1,780
0.50	2	3,940
0.20	5	7,630
0.10	10	10,300
0.04	25	13,500
0.02	50	15,900
0.01	100	18,200
0.005	200	20,400

Magnitude and frequency of annual high discharges, based on period of record 1959-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	137	106	71	55
0.95	1.05	439	330	223	170
0.90	1.11	751	560	383	289
0.80	1.25	1,340	993	687	512
0.50	2	3,240	2,430	1,730	1,250
0.20	5	6,070	4,690	3,430	2,390
0.10	10	7,710	6,070	4,520	3,090
0.04	25	9,390	7,560	5,720	3,830
0.02	50	10,400	8,480	6,480	4,290
0.01	100	11,100	9,250	7,120	4,660
0.005	200	11,800	9,890	7,670	4,980

05482300 NORTH RACCOON RIVER NEAR SAC CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.04	0.10	0.80	1.8	2.9	3.7	3.9
0.02	50	0.00	0.00	0.14	1.0	1.3	2.7	4.0	5.1	5.7
0.05	20	2.3	2.4	2.5	2.6	2.7	4.6	6.7	8.4	10
0.10	10	4.2	4.4	4.5	4.6	4.8	7.4	11	13	16
0.20	5	7.6	7.8	7.9	8.1	9.5	13	18	22	29
0.50	2	20	21	23	27	30	37	50	62	84
0.80	1.25	49	52	58	68	81	103	134	169	232
0.90	1.11	77	81	90	115	128	171	223	284	387
0.96	1.04	123	130	150	170	198	292	381	493	659
0.98	1.02	166	176	200	220	257	409	536	704	921
0.99	1.01	217	231	260	300	319	552	728	968	1,240

Magnitude and frequency of seasonal low discharges, based on period of record July 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.04	0.18	0.53	5.8	6.9	8.4	14
0.02	50	0.00	0.13	0.42	0.97	8.8	10	13	21
0.05	20	1.6	1.7	1.9	2.2	16	18	22	35
0.10	10	3.7	3.9	4.2	4.5	26	30	36	54
0.20	5	8.3	3.6	9.1	9.9	45	52	64	92
0.50	2	29	31	35	38	121	141	171	236
0.80	1.25	78	95	106	117	291	339	414	565
0.90	1.11	124	140	160	194	439	516	630	866
0.96	1.04	193	220	260	316	661	782	956	1,340
0.98	1.02	251	310	390	419	846	1,010	1,230	1,750
0.99	1.01	314	370	450	531	1,050	1,250	1,530	2,210
		July-August-September				October-November-December			
0.01	100	2.5	3.0	3.4	3.7	1.1	1.2	1.3	2.1
0.02	50	3.3	3.9	4.4	5.0	1.7	1.9	2.1	3.2
0.05	20	4.9	5.7	6.5	7.7	3.2	3.7	4.2	6.0
0.10	10	7.0	8.1	9.2	11	5.5	6.4	7.4	10
0.20	5	11	13	14	19	10	12	15	19
0.50	2	26	30	35	50	32	40	48	59
0.80	1.25	66	76	88	137	95	115	138	169
0.90	1.11	109	125	146	236	164	193	232	284
0.96	1.04	188	217	255	428	287	326	388	484
0.98	1.02	269	312	368	633	408	449	531	676
0.99	1.01	373	434	516	905	555	595	697	905

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA

LOCATION.—Lat 41°59'17", long 94°22'36", in SW1/4 NW1/4 sec. 20, T83N, R30W, Greene County, Hydrologic Unit 07100006, on right bank 20 ft downstream from bridge on State Highway 4, 0.1 mi downstream from Drainage Ditch 33 and 40, 1.9 mi south of Jefferson, 4.7 mi (revised) upstream from Hardin Creek, 92.0 miles upstream of mouth of Raccoon River, and at mile 292.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.—1,619 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996. Prior to April 1940, monthly discharge only, published in WSP 1308. Prior to October 1955, published as Raccoon River near Jefferson.

GAGE.—Water-stage recorder. Datum of gage is 967.09 ft above sea level. Prior to April 22, 1946, nonrecording gage at site 4 mi upstream at different datum. April 22 to June 25, 1946, nonrecording gage, June 26, 1946 to September 30, 1955, water-stage recorder, October 1, 1955 to April 30, 1958, nonrecording gage, at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 29,100 ft^3/s, June 23, 1947, gage height, 22.30 ft; minimum daily discharge, 0.60 ft^3/s, October 5, 1956.

Selected values from rating table number 9, developed March 1997

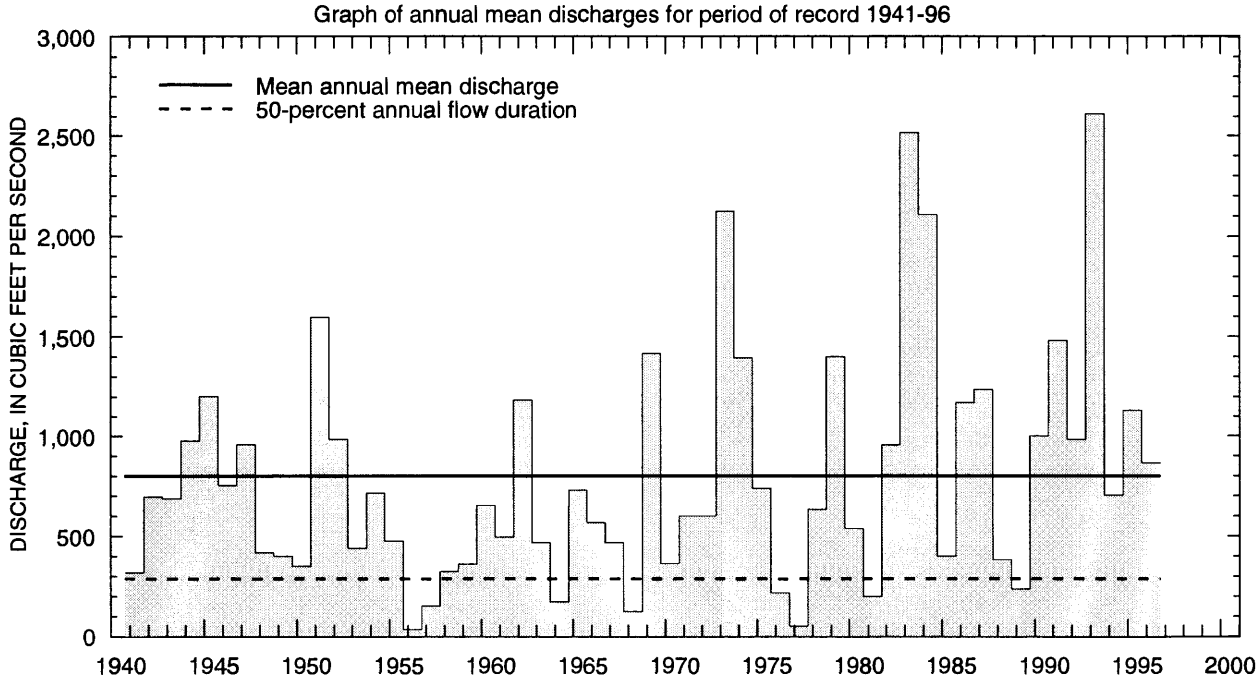
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.2	74.1	12.0	6,540
6.0	470	14.0	9,180
7.0	1,200	16.0	12,000
8.0	2,080	18.0	15,100
10.0	4,150	19.5	17,500

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,654	1974	5.04	1957	447	732
November	2,011	1974	19.8	1956	388	498
December	1,228	1974	13.4	1977	268	298
January	1,045	1973	3.58	1977	205	236
February	2,407	1984	6.89	1977	404	521
March	4,990	1983	68.5	1956	1,281	1,181
April	5,650	1983	46.3	1956	1,452	1,442
May	4,703	1984	54.7	1967	1,375	1,184
June	6,827	1984	61.9	1977	1,819	1,638
July	7,584	1993	18.1	1956	1,032	1,233
August	3,007	1993	12.1	1956	501	659
September	2,823	1962	16.6	1955	410	622
Annual	2,615	1993	32.8	1956	799	585

Graph of annual mean discharges for period of record 1941-96



05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	3.3	19	6.8	3.5	6.5	36	37	34	30	17	9.4	8.8	13
95	23	31	19	15	17	62	69	73	115	68	35	25	27
90	34	41	26	20	27	86	115	145	213	103	45	38	40
85	43	49	32	26	33	105	184	227	310	135	57	45	56
80	50	58	40	30	39	140	248	306	375	164	70	53	72
75	60	74	55	38	50	226	343	381	445	196	81	60	95
70	65	95	75	46	62	285	415	447	528	232	97	68	118
60	99	135	109	70	100	410	540	610	691	334	134	90	184
50	153	174	140	100	128	596	750	794	966	510	184	123	287
40	193	262	200	145	230	850	1,020	1,030	1,360	727	262	180	431
30	289	349	295	215	335	1,210	1,430	1,370	1,850	1,000	388	268	661
25	444	406	350	260	390	1,420	1,720	1,610	2,250	1,210	476	325	832
20	624	539	410	315	500	1,720	2,160	2,010	2,640	1,470	599	407	1,080
15	828	726	500	400	650	2,220	2,680	2,510	3,140	1,770	788	545	1,410
10	1,140	1,120	660	523	947	3,070	3,610	3,220	4,240	2,360	1,120	908	2,010
5	2,020	1,490	947	750	1,610	5,530	5,860	5,270	6,890	3,930	2,100	1,730	3,260

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,680
0.90	1.11	2,390
0.80	1.25	3,580
0.50	2	7,100
0.20	5	12,700
0.10	10	16,600
0.04	25	21,400
0.02	50	24,900
0.01	100	28,200
0.005	200	31,400

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	283	201	150	128
0.95	1.05	934	689	486	390
0.90	1.11	1,600	1,200	835	651
0.80	1.25	2,830	2,160	1,490	1,130
0.50	2	6,550	5,160	3,590	2,610
0.20	5	11,400	9,150	6,640	4,740
0.10	10	13,800	11,200	8,350	5,940
0.04	25	16,000	13,000	10,100	7,150
0.02	50	17,100	14,000	11,000	7,840
0.01	100	17,900	14,700	11,800	8,390
0.005	200	18,500	15,200	12,400	8,820

05482500 NORTH RACCOON RIVER NEAR JEFFERSON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.2	1.3	1.5	1.8	3.4	6.1	8.0	9.9	12
0.02	50	2.0	2.3	2.5	2.9	5.0	8.2	11	13	16
0.05	20	4.3	4.7	5.1	5.7	8.6	13	16	20	25
0.10	10	8.1	8.5	9.1	10	14	19	24	29	38
0.20	5	16	17	18	19	24	31	39	47	62
0.50	2	49	50	52	56	64	78	98	118	162
0.80	1.25	116	120	125	135	156	194	255	308	422
0.90	1.11	168	175	184	201	242	312	425	514	697
0.96	1.04	234	249	262	292	377	519	740	896	1,190
0.98	1.02	281	304	321	363	495	719	1,060	1,290	1,690
0.99	1.01	326	356	379	434	627	965	1,480	1,800	2,310

Magnitude and frequency of seasonal low discharges, based on period of record March 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.5	3.6	3.9	4.6	15	18	20	31
0.02	50	5.0	5.2	5.6	6.6	23	27	29	44
0.05	20	8.5	8.9	9.5	11	40	46	52	73
0.10	10	13	14	15	18	65	74	84	114
0.20	5	23	25	26	31	112	127	146	192
0.50	2	62	68	73	87	284	320	379	496
0.80	1.25	159	176	193	241	631	715	870	1,200
0.90	1.11	255	283	316	406	911	1,040	1,280	1,850
0.96	1.04	415	463	528	701	1,300	1,490	1,870	2,890
0.98	1.02	565	631	730	993	1,600	1,850	2,350	3,820
0.99	1.01	741	828	973	1,360	1,910	2,230	2,850	4,870
		July-August-September				October-November-December			
0.01	100	2.8	6.1	8.0	12	1.4	1.8	3.1	5.7
0.02	50	4.5	8.4	11	15	2.5	3.1	4.9	8.2
0.05	20	8.8	14	16	22	5.6	6.7	9.4	14
0.10	10	15	21	24	31	11	13	16	22
0.20	5	29	34	37	48	23	26	31	39
0.50	2	81	84	91	116	75	85	95	111
0.80	1.25	190	201	223	299	184	224	260	306
0.90	1.11	277	312	357	503	266	343	420	511
0.96	1.04	394	493	594	897	367	508	678	875
0.98	1.02	482	658	825	1,320	437	636	907	1,230
0.99	1.01	569	849	1,110	1,880	500	764	1,170	1,670

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA

LOCATION.—Lat 42°06'27", long 94°22'12", in SE1/4 SW1/4 sec. 5, T84N, R30W, Greene County, Hydrologic Unit 07100006, on left bank 35 ft upstream from bridge on County Highway E26, 1.6 mi upstream from small left-bank tributary, 4.4 mi upstream from mouth and 6.5 mi southeast of Churdan.

DRAINAGE AREA.—24.0 mi^2.

PERIOD OF RECORD.—October 1952 to March 1992.

GAGE.—Water-stage recorder. Datum of gage is 1,050.90 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 870 ft^3/s, June 30, 1986, gage height, 10.78 ft, from flood mark; no flow many days during period of record.

Selected values from rating table number 10, developed October 1986
(A discharge measurement to validate this rating has not been made since February 1992)

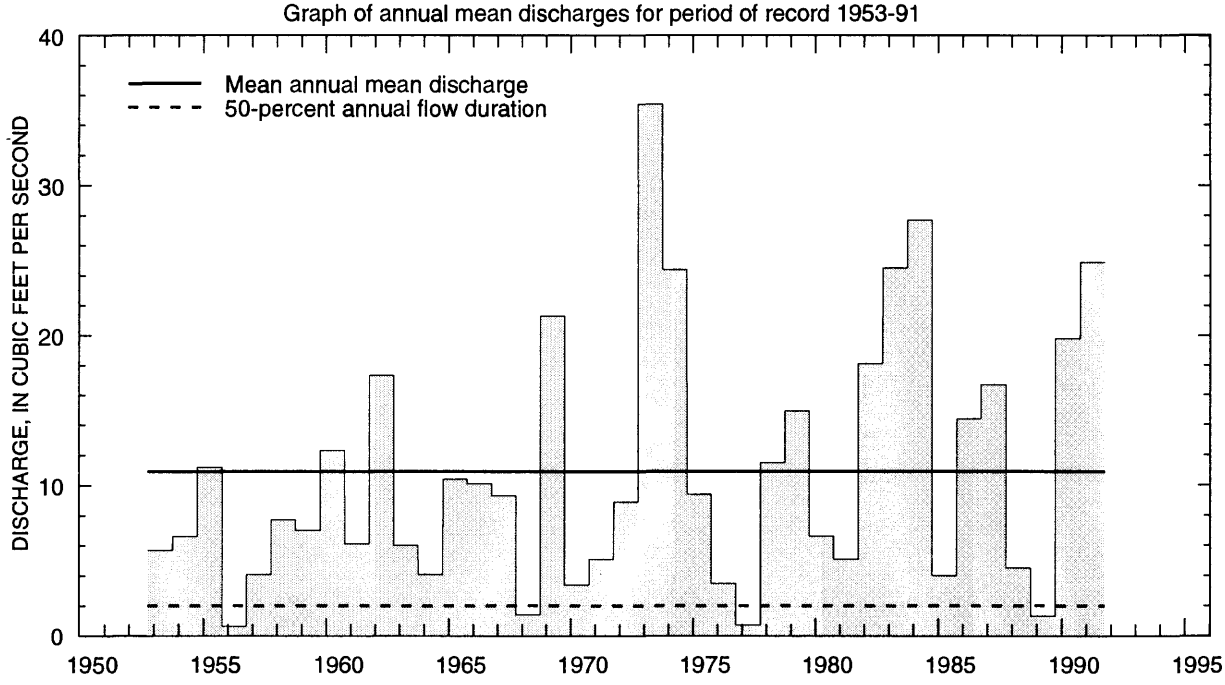
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.5	3.66	6.0	245
2.0	14.4	7.0	335
3.0	50.9	8.0	440
4.0	102	9.0	575
5.0	167	11.0	920

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	47.3	1955	0.000	1957	6.84	12.4
November	38.5	1973	0.000	1981	5.30	8.25
December	26.1	1983	0.000	1956	4.02	6.04
January	19.5	1973	0.000	1956	2.37	4.21
February	56.4	1984	0.000	1956	6.99	12.2
March	87.6	1973	0.009	1977	19.6	23.0
April	101	1991	0.006	1977	19.5	22.9
May	79.1	1982	0.000	1977	22.4	23.0
June	98.7	1967	0.000	1977	22.5	21.7
July	54.9	1969	0.000	1977	12.8	16.5
August	41.6	1954	0.000	1956	4.60	8.96
September	37.7	1978	0.000	1953	4.01	8.87
Annual	35.4	1973	0.56	1956	10.9	8.41

Graph of annual mean discharges for period of record 1953-91



05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.38	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.33	1.4	0.32	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.20	0.27	1.5	2.2	0.50	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.35	1.2	2.5	3.4	0.71	0.05	0.00	0.03
75	0.00	0.04	0.00	0.00	0.00	0.70	2.5	3.8	4.7	1.0	0.10	0.00	0.10
70	0.02	0.10	0.02	0.00	0.10	1.6	4.2	4.9	5.6	1.3	0.14	0.01	0.23
60	0.14	0.23	0.14	0.02	0.30	3.7	6.0	7.1	7.8	2.0	0.29	0.10	0.70
50	0.48	0.77	0.50	0.23	0.60	5.8	8.5	11	10	3.0	0.40	0.20	2.0
40	0.92	3.1	2.5	0.72	1.7	9.8	13	15	14	5.0	0.79	0.40	4.3
30	4.1	5.6	4.4	2.3	2.8	15	18	20	20	8.1	1.4	0.70	7.4
25	6.1	7.2	5.6	2.9	4.1	20	21	24	24	11	1.8	1.1	9.9
20	8.2	9.8	6.9	3.5	5.6	25	26	31	29	14	2.8	1.8	14
15	11	12	8.6	4.7	9.9	35	35	41	36	19	4.4	3.5	18
10	20	15	12	7.1	18	51	51	57	52	29	7.7	6.1	27
5	32	23	17	10	36	98	89	92	94	62	17	17	50

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 40 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	81
0.90	1.11	104
0.80	1.25	138
0.50	2	230
0.20	5	365
0.10	10	456
0.04	25	570
0.02	50	654
0.01	100	737
0.005	200	818

Magnitude and frequency of annual high discharges, based on period of record 1953-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	15	7.9	4.9	3.6
0.95	1.05	31	18	12	8.5
0.90	1.11	45	27	18	13
0.80	1.25	67	43	28	20
0.50	2	129	89	60	42
0.20	5	214	158	109	76
0.10	10	266	203	141	98
0.04	25	322	254	176	123
0.02	50	359	289	200	139
0.01	100	391	320	221	154
0.005	200	418	347	240	167

05483000 EAST FORK HARDIN CREEK NEAR CHURDAN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05
0.50	2	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.33	0.68
0.80	1.25	0.14	0.17	0.21	0.28	0.49	0.88	1.8	2.6	4.8
0.90	1.11	0.47	0.53	0.65	0.79	1.3	2.2	4.8	7.1	12
0.96	1.04	1.2	1.3	1.5	1.9	3.1	5.5	12	19	31
0.98	1.02	2.0	2.1	2.5	3.1	5.1	9.5	22	35	57
0.99	1.01	3.1	3.1	3.6	4.8	7.9	16	39	62	97

Magnitude and frequency of seasonal low discharges, based on period of record October 1952 to December 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
0.20	5	0.00	0.00	0.00	0.00	0.12	0.20	0.39	0.79
0.50	2	0.00	0.00	0.10	0.18	2.6	2.9	4.0	5.5
0.80	1.25	1.7	1.9	2.0	2.3	8.0	9.8	12	18
0.90	1.11	3.2	3.6	4.0	5.8	11	14	18	28
0.96	1.04	5.3	6.2	7.6	13	13	19	24	38
0.98	1.02	6.9	8.3	11	21	15	22	28	44
0.99	1.01	8.6	11	15	32	15	23	31	49
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.50	2	0.02	0.06	0.08	0.17	0.00	0.03	0.17	0.29
0.80	1.25	0.30	0.42	0.62	1.1	1.6	1.8	2.4	3.6
0.90	1.11	0.67	0.88	1.3	2.5	3.6	4.9	6.1	9.6
0.96	1.04	1.4	1.7	2.8	5.5	6.5	11	14	23
0.98	1.02	2.1	2.5	4.2	9.2	8.3	16	22	38
0.99	1.01	3.1	3.6	6.2	15	10	23	33	60

05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IOWA

LOCATION.—Lat 41°46'43", long 94°29'33", in SW1/4 SW1/4 sec. 32, T81N, R31W, Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on State HIghway 25, 0.2 mi downstream from Battle Run Creek, 1.8 mi upstream from Springbrook Creek, 5.8 mi southeast of Bayard, 10.3 mi (revised) upstream from dam at Lake Panorama, at mile 78.0 mi. upstream from mouth of Raccoon River, and at mile 279.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.—375 mi^2.

PERIOD OF RECORD.—March 1979 to September 1996. Occasional low flow measurements, water years 1976, 1977.

GAGE.—Water-stage recorder. Datum of gage is 1,040.00 ft above sea level. Prior to June 23, 1979, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 27,500 ft^3/s, July 9, 1993, gage height, 29.02 ft; minimum daily discharge, 5.5 ft^3/s, June 13, 14, 1981.

Selected values from rating table number 6, developed February 1996

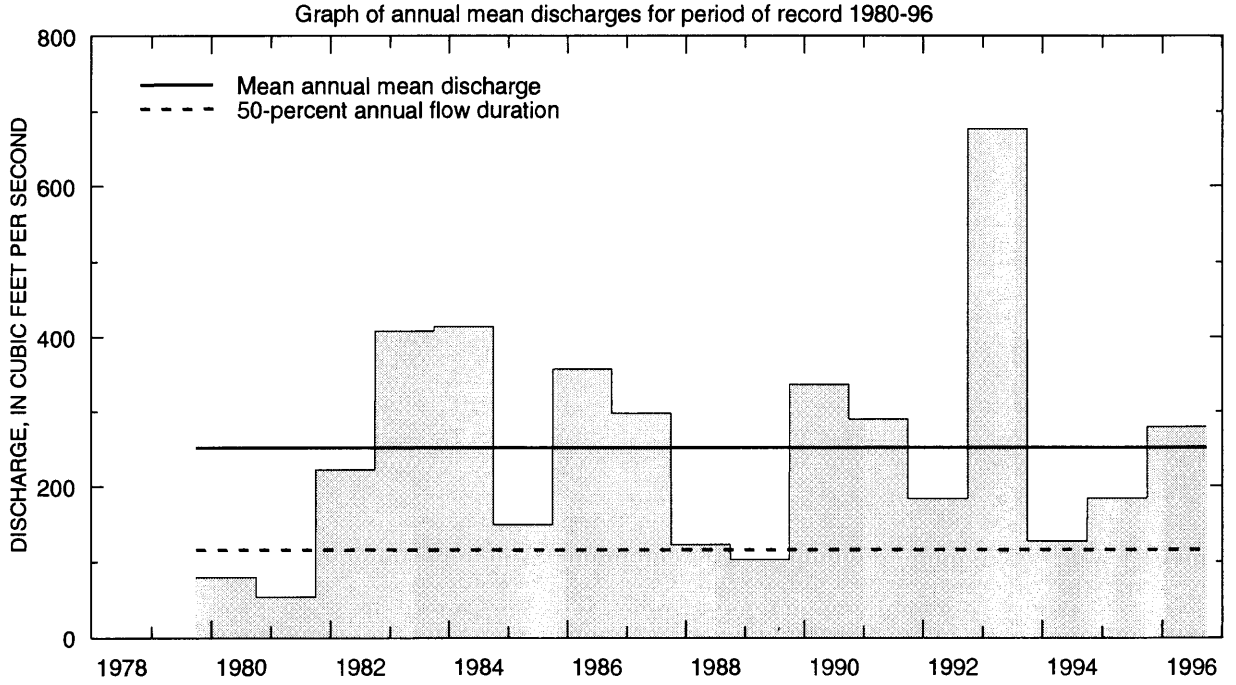
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
8.5	22.9	15.0	1,630
9.0	71.0	18.0	2,750
10.0	220	21.0	5,610
11.0	426	24.0	11,000
12.0	681	29.0	26,000

05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1980-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	587	1987	20.1	1981	117	137
November	376	1993	18.3	1981	120	99.9
December	347	1993	12.5	1981	125	103
January	175	1993	13.8	1981	92.3	59.7
February	645	1983	27.4	1990	185	174
March	907	1993	23.3	1981	305	234
April	1,035	1991	22.9	1981	367	354
May	993	1984	51.6	1981	445	315
June	1,667	1990	106	1981	497	433
July	2,653	1993	40.2	1980	442	625
August	673	1993	35.7	1985	202	219
September	466	1993	18.8	1980	124	129
Annual	677	1993	54.1	1981	252	158

Graph of annual mean discharges for period of record 1980-96



05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1980-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	15	16	11	11	14	20	13	13	7.8	25	18	16	13
95	24	20	14	14	18	26	30	28	49	38	28	22	22
90	31	39	23	17	26	46	53	56	84	49	32	27	32
85	35	45	34	21	34	54	76	65	98	58	35	29	39
80	38	49	37	29	40	79	87	79	115	69	39	32	47
75	41	50	48	35	50	105	105	93	131	80	45	36	53
70	43	52	53	40	56	130	117	120	152	90	51	39	60
60	52	60	65	56	80	160	143	216	197	122	63	44	84
50	60	72	82	80	99	192	201	297	272	178	80	54	116
40	73	102	110	105	120	230	285	397	340	235	109	74	156
30	115	129	140	120	150	327	397	506	448	316	157	108	214
25	143	150	159	132	162	400	459	556	512	375	199	142	260
20	168	171	199	150	180	466	558	654	588	453	259	180	324
15	203	222	224	161	239	556	714	776	703	595	342	233	412
10	256	283	255	180	350	641	922	1,040	1,000	850	430	325	554
5	357	339	369	200	754	948	1,280	1,380	1,520	1,340	675	411	870

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 24 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	583
0.95	1.05	1,030
0.90	1.11	1,390
0.80	1.25	2,000
0.50	2	3,950
0.20	5	7,720
0.10	10	10,900
0.04	25	15,800
0.02	50	19,900
0.01	100	24,600
0.005	200	29,700

Magnitude and frequency of annual high discharges, based on period of record 1980-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	280	191	119	84
0.95	1.05	456	309	203	152
0.90	1.11	604	408	274	208
0.80	1.25	867	582	396	304
0.50	2	1,840	1,220	828	624
0.20	5	4,250	2,770	1,800	1,270
0.10	10	6,810	4,410	2,750	1,840
0.04	25	11,600	7,420	4,370	2,730
0.02	50	16,600	10,500	5,930	3,510
0.01	100	23,100	14,600	7,850	4,400
0.005	200	29,600	19,800	10,200	5,410

05483450 MIDDLE RACCOON RIVER NEAR BAYARD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1979 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.8	4.2	5.0	6.3	8.0	11	11	13	15
0.02	50	5.0	5.4	6.4	7.8	9.8	13	14	16	19
0.05	20	7.4	7.8	9.0	11	13	17	19	22	26
0.10	10	10	11	12	14	17	22	25	28	34
0.20	5	15	16	17	20	23	29	34	38	46
0.50	2	30	31	33	36	41	51	61	68	83
0.80	1.25	55	57	61	64	73	89	105	115	144
0.90	1.11	74	76	82	85	99	118	137	150	189
0.96	1.04	99	103	111	115	136	161	180	197	251
0.98	1.02	119	124	134	140	166	197	213	233	300
0.99	1.01	140	145	158	166	199	236	248	270	351

Magnitude and frequency of seasonal low discharges, based on period of record April 1979 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.1	5.7	6.1	6.6	4.0	5.3	8.1	16
0.02	50	6.8	7.7	8.3	9.0	6.6	8.4	12	21
0.05	20	10	12	13	14	13	16	21	32
0.10	10	15	17	18	20	24	27	33	46
0.20	5	22	25	27	31	44	49	55	71
0.50	2	43	49	54	63	117	127	136	159
0.80	1.25	78	88	97	114	238	270	296	345
0.90	1.11	102	115	128	149	315	371	423	512
0.96	1.04	133	150	166	192	400	495	598	772
0.98	1.02	156	176	194	223	453	582	734	1,000
0.99	1.01	178	200	220	252	498	662	873	1,260
		July-August-September				October-November-December			
0.01	100	14	16	16	18	7.6	8.4	9.2	10
0.02	50	14	17	18	20	8.9	10	11	13
0.05	20	16	18	20	22	11	13	14	17
0.10	10	19	21	23	26	14	17	18	23
0.20	5	23	25	28	32	19	23	25	32
0.50	2	39	42	46	55	35	43	48	61
0.80	1.25	78	83	90	114	70	83	94	115
0.90	1.11	123	130	139	183	103	119	136	161
0.96	1.04	214	225	236	324	159	179	204	230
0.98	1.02	317	332	343	488	214	233	268	290
0.99	1.01	463	484	493	725	282	299	343	357

05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA

LOCATION.—Lat 41°41'14", long 94°22'15", in NE1/4 NW1/4 sec. 5, T79N, R30W, Guthrie County, Hydrologic Unit 07100007, on left bank 15 ft downstream from bridge on Soldier Trail, 0.2 mi southwest of Panora, 1.5 mi upstream from Andy's Branch, 1.6 mi downstream from Lake Panorama, 18.1 mi (revised) upstream from mouth, 66.1 mi upstream from mouth of Raccoon River, and at mile 267.2 upstream from mouth of Des Moines River.

DRAINAGE AREA.—440 mi^2.

PERIOD OF RECORD.—June 1958 to September 1996.

GAGE.—Water-stage recorder and concrete control. Datum of gage is 991.20 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 22,400 ft^3/s, July 9, 1993, gage height, 20.04 ft; no flow June 9-10, 1977, result of gate operation at Lake Panorama.

REMARKS.—Flow regulated by dam on Lake Panorama (station 05483470) since August 1970.

Selected values from rating table number 7, developed October 1992

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	31.3	12.0	8,050
5.0	331	15.0	12,800
6.0	1,010	18.0	18,300
7.0	1,900	21.0	24,500
8.0	2,950	23.0	29,000
10.0	5,290		

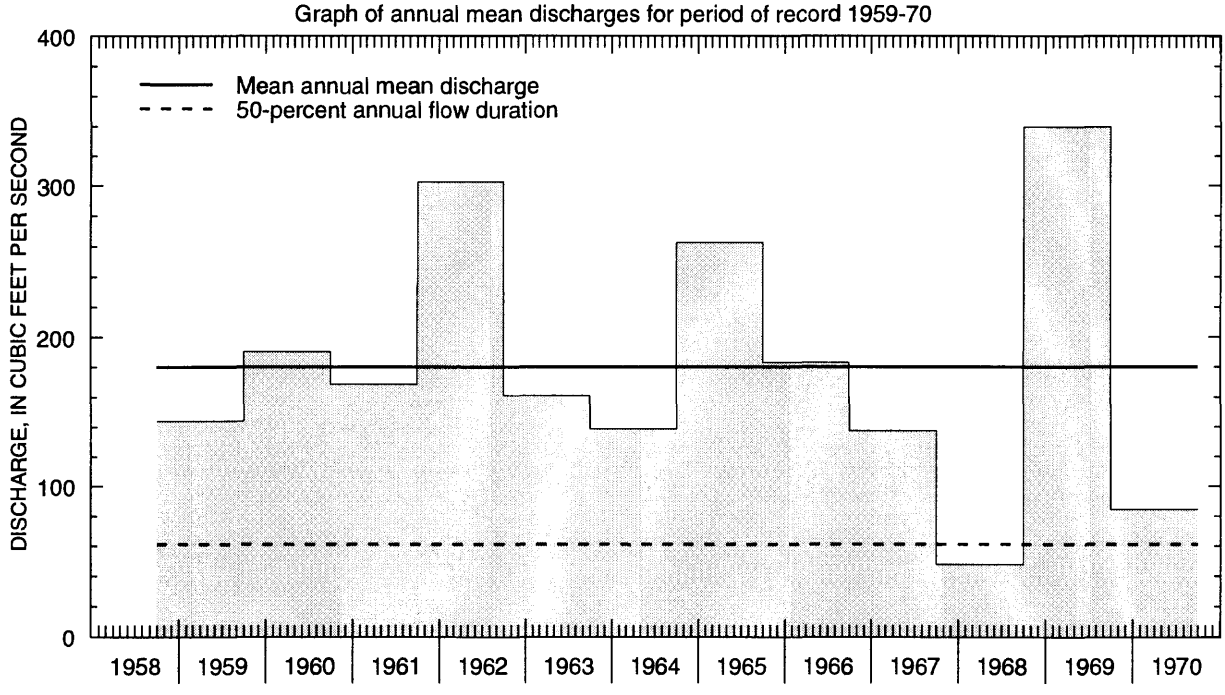
05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1959-70

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	292	1966	24.6	1960	93.1	101
November	177	1962	27.7	1968	67.9	55.4
December	126	1966	21.9	1959	49.6	37.5
January	98.6	1966	16.5	1968	42.9	27.5
February	231	1965	24.1	1968	88.2	67.6
March	1,478	1969	36.2	1968	472	473
April	840	1965	35.3	1967	321	255
May	542	1960	28.2	1967	276	160
June	1,189	1967	74.7	1970	399	320
July	718	1969	33.2	1970	171	181
August	384	1963	22.5	1970	95.7	101
September	353	1965	21.8	1970	80.7	90.0
Annual	340	1969	47.9	1968	180	84.9

Graph of annual mean discharges for period of record 1959-70



05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1959-70

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	19	16	15	10	15	26	26	20	21	31	20	19	16
95	22	25	18	15	17	31	32	27	30	33	22	21	21
90	26	27	20	17	18	32	35	35	41	37	24	23	25
85	27	28	22	20	23	36	62	45	70	42	27	25	28
80	30	29	24	21	27	40	74	76	99	51	29	27	31
75	32	31	25	24	30	46	94	106	115	60	32	30	34
70	34	34	26	26	33	58	111	125	130	66	35	35	38
60	38	39	28	28	39	93	138	154	156	76	43	42	46
50	42	42	31	32	46	120	192	184	190	94	50	48	61
40	48	46	35	36	52	176	250	213	240	120	58	54	90
30	58	53	45	45	69	305	300	260	329	159	69	63	133
25	67	75	56	56	80	379	325	290	406	186	82	67	159
20	138	128	74	64	100	527	380	358	480	217	94	73	198
15	177	145	110	80	133	702	476	434	655	254	111	85	254
10	218	164	122	85	200	1,330	610	584	1,010	346	144	102	356
5	347	188	138	95	300	3,060	1,050	898	1,880	603	241	222	641

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 14 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	2,470
0.80	1.25	3,120
0.50	2	4,770
0.20	5	7,170
0.10	10	8,810
0.04	25	10,900
0.02	50	12,500
0.01	100	14,100
0.005	200	15,700

Magnitude and frequency of annual high discharges, based on period of record 1959-70

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	401	358	205	113
0.95	1.05	773	568	334	213
0.90	1.11	1,050	723	430	291
0.80	1.25	1,470	963	582	412
0.50	2	2,490	1,650	1,020	742
0.20	5	3,710	2,760	1,770	1,220
0.10	10	4,350	3,590	2,330	1,520
0.04	25	4,990	4,730	3,120	1,870
0.02	50	5,700	5,640	3,760	2,120
0.01	100	6,700	6,580	4,430	2,340
0.005	200	7,800	7,580	5,140	2,560

05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1959 to March 1970

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.39	9.6	11	12	16	21	21	22	22
0.02	50	0.80	10	11	12	17	21	22	23	23
0.05	20	2.1	12	12	14	17	22	23	24	25
0.10	10	4.1	13	14	15	18	22	23	23	26
0.20	5	8.1	15	15	17	20	24	26	27	30
0.50	2	18	20	21	23	25	29	35	40	46
0.80	1.25	25	27	30	33	38	43	56	68	80
0.90	1.11	26	32	38	41	50	57	76	96	114
0.96	1.04	27	39	50	53	71	82	111	145	176
0.98	1.02	27	43	60	63	91	107	146	195	240
0.99	1.01	27	49	71	75	118	141	192	260	324

Magnitude and frequency of seasonal low discharges, based on period of record
July 1958 to September 1970

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	8.2	8.2	8.8	12	0.27	9.4	10	12
0.02	50	9.2	9.2	9.9	13	0.66	13	14	17
0.05	20	11	11	12	15	2.2	20	23	29
0.10	10	13	13	14	17	5.6	28	33	45
0.20	5	16	16	18	21	14	41	50	70
0.50	2	24	26	28	31	56	78	96	136
0.80	1.25	39	43	46	50	125	129	159	213
0.90	1.11	52	58	61	67	159	160	194	249
0.96	1.04	73	80	83	92	188	193	232	282
0.98	1.02	91	100	103	114	201	215	255	298
0.99	1.01	114	122	126	140	209	234	275	310
		July-August-September				October-November-December			
0.01	100	3.9	14	14	15	8.8	14	14	15
0.02	50	5.4	15	16	17	9.2	15	15	16
0.05	20	8.6	17	19	21	9.9	15	16	18
0.10	10	12	20	21	25	11	16	17	19
0.20	5	18	23	25	30	12	18	20	23
0.50	2	30	32	34	45	17	26	30	34
0.80	1.25	42	43	47	65	28	44	55	62
0.90	1.11	47	51	55	79	38	63	82	90
0.96	1.04	50	61	66	97	56	101	133	144
0.98	1.02	52	69	74	110	73	142	188	201
0.99	1.01	53	77	82	123	95	200	263	277

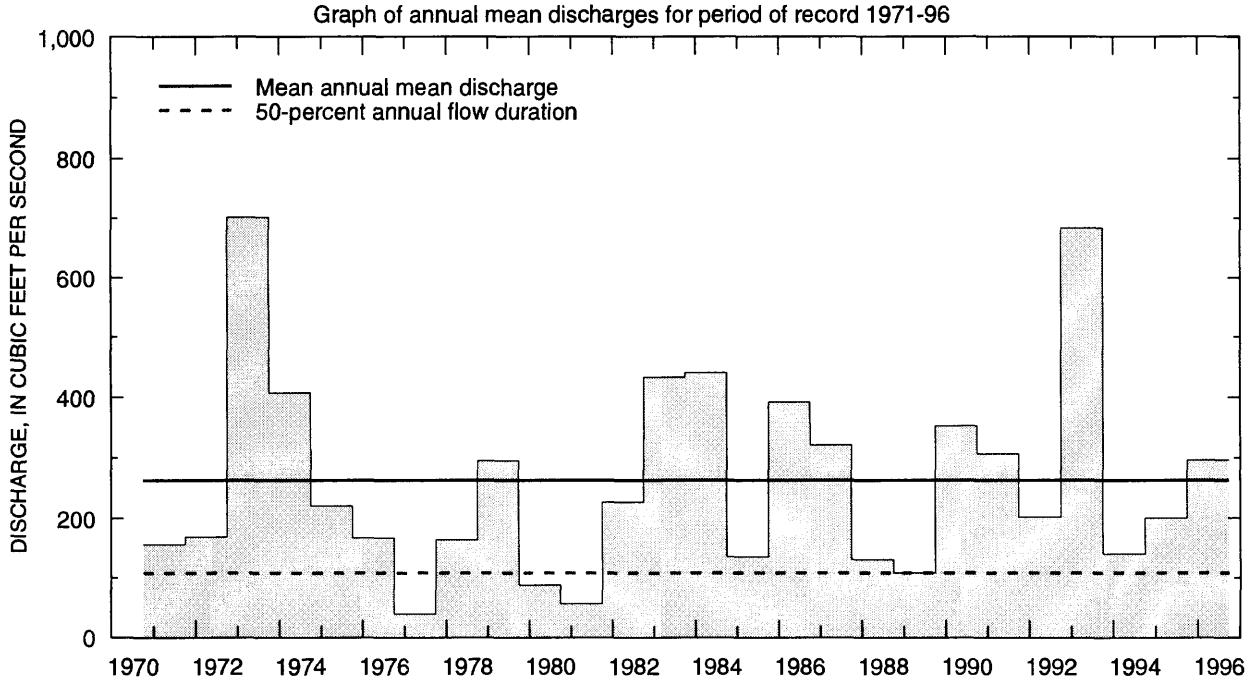
05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1971-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	670	1987	19.5	1981	129	161
November	588	1973	12.8	1971	147	134
December	356	1993	7.60	1971	125	102
January	439	1973	6.95	1971	101	93.8
February	838	1971	27.8	1972	217	228
March	1,479	1979	20.2	1981	393	345
April	1,222	1984	26.4	1977	375	360
May	1,458	1974	20.0	1977	487	387
June	1,646	1990	9.40	1977	451	375
July	2,731	1993	5.56	1977	398	596
August	668	1996	22.2	1971	175	186
September	528	1973	19.3	1980	151	157
Annual	701	1973	38.6	1977	263	171

Graph of annual mean discharges for period of record 1971-96



05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1971-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	17	8.3	7.1	6.9	6.2	18	18	19	4.8	3.1	4.8	18	7.1
95	20	19	20	19	24	31	24	23	24	21	21	21	21
90	24	30	33	26	28	37	32	45	52	30	28	29	30
85	32	36	36	29	32	58	41	61	80	35	31	32	35
80	33	44	39	34	42	69	57	89	99	47	36	34	41
75	36	48	49	38	47	91	88	111	115	63	40	37	49
70	40	54	53	42	50	111	101	140	137	83	45	40	55
60	50	64	61	53	60	155	140	200	178	104	54	47	74
50	59	83	72	60	81	193	207	264	259	136	66	56	108
40	73	113	94	89	119	251	308	394	341	195	90	70	154
30	111	165	143	122	151	344	410	510	437	265	134	106	217
25	136	192	179	137	177	419	480	585	491	303	179	128	265
20	167	225	204	155	206	538	565	671	593	362	222	164	330
15	225	294	233	179	303	662	675	881	720	501	280	239	424
10	300	354	271	206	471	919	911	1,140	879	718	390	306	585
5	425	470	350	257	832	1,460	1,330	1,550	1,460	1,370	581	493	955

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 26 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	927
0.95	1.05	1,550
0.90	1.11	2,030
0.80	1.25	2,790
0.50	2	5,090
0.20	5	9,120
0.10	10	12,300
0.04	25	16,800
0.02	50	20,500
0.01	100	24,500
0.005	200	28,700

Magnitude and frequency of annual high discharges, based on period of record 1971-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	242	159	117	89
0.95	1.05	490	321	226	171
0.90	1.11	707	461	318	240
0.80	1.25	1,090	709	477	355
0.50	2	2,460	1,570	1,010	723
0.20	5	5,360	3,360	2,080	1,400
0.10	10	7,970	4,920	3,000	1,950
0.04	25	12,000	7,330	4,380	2,720
0.02	50	15,600	9,420	5,570	3,350
0.01	100	19,700	11,800	6,900	4,020
0.005	200	24,300	14,400	8,360	4,730

05483600 MIDDLE RACCOON RIVER AT PANORA, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1971 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	3.0	3.6	4.0	4.2	6.1	7.6	9.4	18
0.02	50	0.00	4.6	5.1	5.8	6.1	8.3	10	12	21
0.05	20	7.9	7.9	8.4	9.5	10	13	15	18	28
0.10	10	12	12	12	14	16	19	22	25	36
0.20	5	18	18	19	21	24	28	32	36	48
0.50	2	29	33	36	41	48	57	65	72	88
0.80	1.25	37	45	58	66	78	104	121	132	164
0.90	1.11	42	49	69	79	94	136	163	177	230
0.96	1.04	46	52	80	92	108	177	218	237	331
0.98	1.02	48	53	86	99	117	206	260	284	421
0.99	1.01	50	53	90	105	123	234	303	332	524

Magnitude and frequency of seasonal low discharges, based on period of record October 1970 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4.4	5.9	6.6	7.2	0.00	4.3	5.8	8.0
0.02	50	6.5	8.1	8.8	9.5	0.00	6.7	8.7	12
0.05	20	11	13	13	14	13	14	16	22
0.10	10	17	18	19	20	19	21	26	36
0.20	5	26	28	29	31	25	38	46	64
0.50	2	50	56	59	66	47	101	123	168
0.80	1.25	78	102	111	131	99	230	292	380
0.90	1.11	93	133	149	184	154	333	436	551
0.96	1.04	106	171	199	261	256	473	647	787
0.98	1.02	113	198	237	324	366	580	819	970
0.99	1.01	118	224	275	391	516	687	1,000	1,150
		July-August-September				October-November-December			
0.01	100	4.3	4.4	4.7	7.3	7.9	7.9	7.9	7.9
0.02	50	5.6	5.9	6.5	9.3	9.9	9.9	9.9	10
0.05	20	8.3	9.1	10	13	13	14	14	15
0.10	10	12	13	15	18	16	18	19	21
0.20	5	17	20	23	27	22	25	27	30
0.50	2	32	41	48	56	37	47	53	62
0.80	1.25	57	78	89	115	64	87	102	123
0.90	1.11	74	106	117	166	85	122	143	174
0.96	1.04	96	142	153	245	115	173	206	249
0.98	1.02	113	170	179	314	139	217	259	312
0.99	1.01	128	197	203	392	166	267	318	382

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05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA

LOCATION.—Lat 41°35'22", long 94°09'04", in SW1/4 NE1/4 sec. 2, T78N, R29W, Dallas County, Hydrologic Unit 07100007, on right bank 20 ft upstream from bridge on H Avenue, 3.4 mi (revised) downstream from bridge on U.S. Highway 6, 3.4 mi downstream from Middle Raccoon River, 14.3 mi (revised) upstream from mouth, 44.6 mi upstream of mouth of Raccoon River, and at mile 245.6 upstream from mouth of Des Moines River.

DRAINAGE AREA.—994 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 888.88 ft above sea level. Prior to June 12, 1946, nonrecording gage, June 12, 1946 to September 30, 1986, water-stage recorder at site 2.4 mi upstream at datum 7.55 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 44,000 ft^3/s, July 10, 1993, gage height, 26.98 ft; maximum gage height, 29.04 ft, July 2, 1958, from flood mark; minimum daily discharge, 17 ft^3/s, August 4, 1977.

Selected values from rating table number 9, developed October 1992

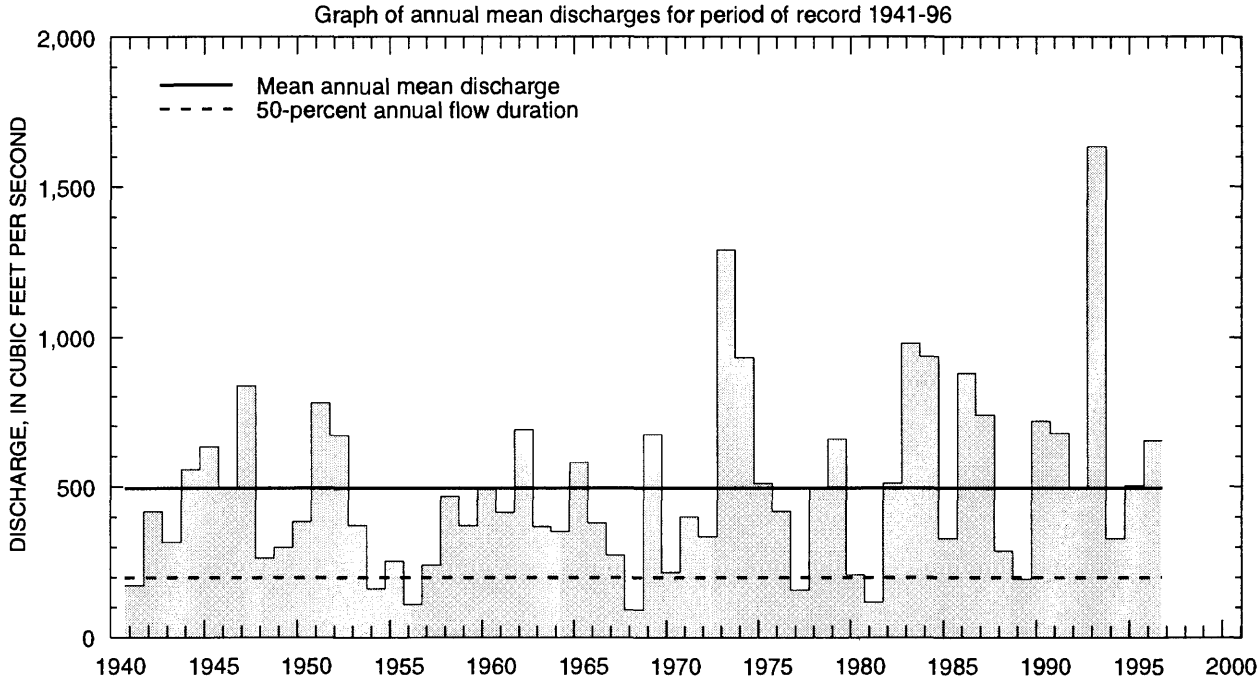
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	120	12.0	7,420
4.0	415	15.0	11,900
5.0	858	18.0	17,200
6.0	1,440	21.0	23,900
8.0	2,970	24.0	32,900
10.0	4,970	27.0	44,000

05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,501	1987	28.6	1941	232	275
November	1,162	1973	36.2	1956	230	220
December	826	1993	32.4	1956	188	181
January	565	1983	30.4	1950	172	147
February	1,785	1971	35.5	1956	388	358
March	3,112	1979	74.2	1981	845	708
April	2,475	1984	50.0	1956	739	651
May	3,005	1974	62.9	1967	858	709
June	5,017	1947	43.2	1977	982	894
July	5,494	1993	57.4	1954	626	875
August	2,745	1993	37.8	1955	375	439
September	1,385	1993	36.0	1955	294	308
Annual	1,632	1993	91.4	1968	494	295

Graph of annual mean discharges for period of record 1941-96



05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	28	37	32	24	29	60	48	43	38	31	29	26	30
95	42	54	42	34	42	77	74	60	76	59	42	46	47
90	51	60	48	42	53	96	94	86	110	78	56	51	58
85	60	70	54	49	60	112	125	121	163	99	68	57	70
80	66	82	60	54	70	140	164	172	199	123	77	67	82
75	76	90	66	60	84	180	195	224	237	146	88	74	95
70	87	98	75	66	96	230	227	285	273	165	99	86	108
60	100	113	88	84	120	329	289	376	363	220	124	108	141
50	115	132	111	100	161	420	399	490	488	280	153	127	199
40	138	160	140	130	250	532	586	630	655	359	196	151	287
30	188	235	183	170	338	720	800	860	890	487	266	198	400
25	245	280	224	205	400	863	912	1,010	1,060	568	321	243	487
20	317	328	276	260	460	1,070	1,060	1,160	1,270	663	413	318	605
15	376	394	325	330	600	1,370	1,270	1,410	1,590	827	548	400	790
10	489	501	413	396	871	1,940	1,600	1,910	2,130	1,170	766	545	1,100
5	814	716	560	500	1,450	3,070	2,480	2,960	3,370	1,970	1,270	1,010	1,770

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,820
0.95	1.05	3,220
0.90	1.11	4,290
0.80	1.25	5,940
0.50	2	10,500
0.20	5	17,400
0.10	10	22,000
0.04	25	27,800
0.02	50	31,900
0.01	100	36,000
0.005	200	39,900

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	605	481	310	224
0.95	1.05	1,280	910	591	429
0.90	1.11	1,830	1,250	814	591
0.80	1.25	2,750	1,800	1,170	850
0.50	2	5,450	3,420	2,220	1,580
0.20	5	9,600	6,020	3,880	2,700
0.10	10	12,400	7,850	5,040	3,450
0.04	25	15,700	10,200	6,520	4,380
0.02	50	18,000	12,000	7,610	5,040
0.01	100	20,200	13,700	8,670	5,670
0.005	200	22,200	15,400	9,720	6,280

05484000 SOUTH RACCOON RIVER AT REDFIELD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	14	15	17	19	23	29	33	34	36
0.02	50	16	17	19	21	25	31	36	38	42
0.05	20	20	21	23	25	30	37	42	46	53
0.10	10	24	25	27	29	35	43	49	54	66
0.20	5	30	31	34	37	43	53	61	68	86
0.50	2	49	52	55	60	70	85	99	113	151
0.80	1.25	86	91	97	106	121	154	180	203	275
0.90	1.11	119	125	135	146	167	220	258	286	383
0.96	1.04	171	181	197	212	242	334	393	426	554
0.98	1.02	219	233	256	274	312	446	527	559	708
0.99	1.01	275	294	326	348	395	586	695	722	887

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	17	17	17	21	20	23	27	31
0.02	50	19	19	21	25	26	30	34	41
0.05	20	24	25	27	32	38	44	49	61
0.10	10	29	32	34	40	52	62	68	86
0.20	5	39	42	46	55	77	92	102	132
0.50	2	68	77	84	103	158	193	220	294
0.80	1.25	128	148	162	206	309	396	475	649
0.90	1.11	184	213	233	304	431	571	711	976
0.96	1.04	276	319	348	470	607	838	1,090	1,500
0.98	1.02	363	417	454	630	753	1,070	1,450	1,980
0.99	1.01	470	535	580	826	910	1,330	1,860	2,540
		July-August-September				October-November-December			
0.01	100	18	25	26	32	22	25	25	27
0.02	50	20	27	28	35	24	27	28	31
0.05	20	25	31	33	42	27	31	34	38
0.10	10	30	37	40	50	31	36	40	46
0.20	5	39	45	50	63	38	45	50	59
0.50	2	68	76	84	109	61	73	85	101
0.80	1.25	128	144	159	211	114	136	157	189
0.90	1.11	186	213	235	314	166	197	227	271
0.96	1.04	283	338	368	501	262	307	347	409
0.98	1.02	378	468	504	694	360	418	465	541
0.99	1.01	495	638	678	944	489	560	613	702

05484500 RACCOON RIVER AT VAN METER, IOWA

LOCATION.—Lat 41°32'02", long 93°56'59", in SW1/4 SW1/4 sec. 22, T78N, R27W, Dallas County, Hydrologic Unit 07100006, on right bank 10 ft downstream from bridge on County Highway R16, 0.3 mi northeast of Van Meter, 0.7 mi upstream from small left bank tributary, 1.1 mi downstream from confluence of North and South Raccoon Rivers, 29.1 mi (revised) upstream from mouth and at mile 230.5 upstream from mouth of Des Moines River.

DRAINAGE AREA.—3,441 mi^2.

PERIOD OF RECORD.—April 1915 to September 1996. Prior to October 1934, monthly discharge only, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 841.16 ft above sea level. See WSP 1308 for history of changes prior to August 8, 1934.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 70,100 ft^3/s, July 10, 1993, gage height, 26.34 ft; minimum daily discharge, 10 ft^3/s, January 22–31, 1940.

Selected values from rating table number 7, developed October 1993

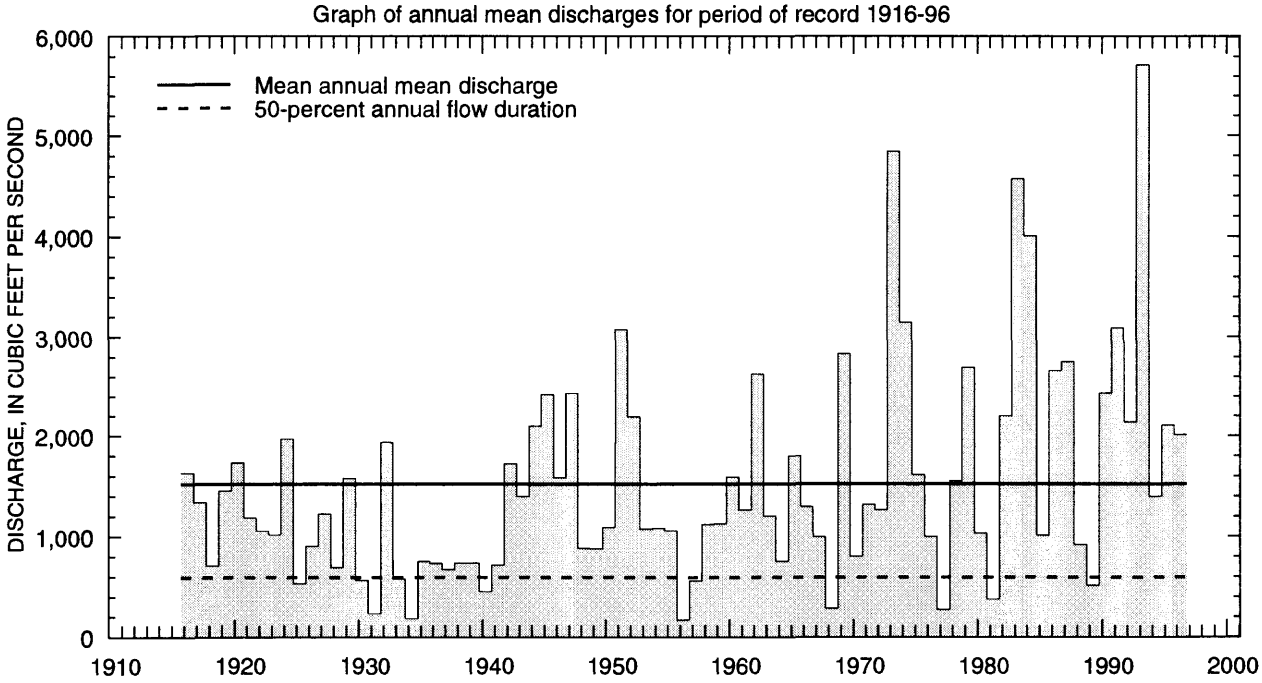
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	69.5	12.0	10,800
4.0	837	15.0	15,000
6.0	2,880	18.0	20,500
8.0	5,700	21.0	33,300
10.0	8,210	26.0	68,700

05484500 RACCOON RIVER AT VAN METER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1916-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	6,840	1974	48.6	1940	838	1,250
November	4,774	1973	51.5	1938	762	884
December	3,085	1983	31.0	1938	561	658
January	3,461	1932	17.2	1940	489	619
February	5,438	1984	31.5	1940	970	1,049
March	10,480	1979	146	1931	2,627	2,202
April	10,630	1983	125	1956	2,544	2,491
May	9,257	1984	121	1934	2,543	2,289
June	13,970	1947	112	1977	3,198	2,847
July	17,260	1993	68.1	1936	1,844	2,473
August	7,414	1993	28.1	1936	995	1,187
September	6,692	1926	43.1	1939	886	1,169
Annual	5,717	1993	166	1956	1,522	1,064

Graph of annual mean discharges for period of record 1916-96



05484500 RACCOON RIVER AT VAN METER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1916-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	38	52	37	18	25	118	129	92	74	52	27	40	41
95	64	82	60	48	54	170	190	150	195	116	88	70	77
90	92	113	80	60	84	228	262	243	330	195	118	95	111
85	110	136	100	72	104	300	359	379	492	261	140	116	149
80	132	162	120	94	145	459	476	539	669	317	167	134	180
75	155	183	140	100	160	603	638	697	824	365	195	157	220
70	180	210	170	130	190	745	755	839	999	428	230	188	270
60	228	277	220	185	290	1,090	1,060	1,210	1,370	590	308	247	394
50	312	375	288	230	440	1,460	1,400	1,540	1,820	836	402	325	595
40	422	521	384	310	588	1,980	1,870	1,930	2,440	1,190	543	454	900
30	623	771	546	460	900	2,650	2,740	2,500	3,350	1,690	812	646	1,360
25	835	960	640	540	1,090	3,200	3,220	3,030	3,880	2,010	1,030	803	1,670
20	1,090	1,120	800	640	1,320	3,800	3,860	3,740	4,590	2,440	1,340	994	2,090
15	1,510	1,380	1,010	800	1,690	4,840	4,700	4,510	5,720	3,130	1,720	1,330	2,750
10	2,150	1,810	1,380	1,180	2,180	6,560	6,120	6,240	7,650	4,200	2,370	2,130	3,830
5	3,300	2,680	2,020	1,840	3,800	9,610	9,340	9,210	11,700	6,280	4,080	3,830	6,060

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 82 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	5,020
0.90	1.11	6,400
0.80	1.25	8,530
0.50	2	14,500
0.20	5	23,900
0.10	10	30,800
0.04	25	40,000
0.02	50	47,100
0.01	100	54,500
0.005	200	62,100

Magnitude and frequency of annual high discharges, based on period of record 1916-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,690	1,180	765	561
0.95	1.05	3,120	2,350	1,590	1,160
0.90	1.11	4,230	3,280	2,270	1,650
0.80	1.25	6,000	4,780	3,380	2,440
0.50	2	11,000	9,040	6,540	4,720
0.20	5	18,900	15,400	11,200	8,090
0.10	10	24,200	19,600	14,200	10,300
0.04	25	31,000	24,600	17,800	12,800
0.02	50	36,000	28,100	20,200	14,600
0.01	100	40,900	31,300	22,400	16,200
0.005	200	45,700	34,400	24,500	17,700

05484500 RACCOON RIVER AT VAN METER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1916 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	15	15	16	17	20	29	36	40	45
0.02	50	18	19	20	21	25	35	44	49	58
0.05	20	25	27	28	29	35	48	60	68	83
0.10	10	34	36	37	40	48	63	80	92	116
0.20	5	48	51	54	59	70	90	114	133	175
0.50	2	99	105	112	123	146	186	235	279	384
0.80	1.25	210	222	238	260	311	400	513	614	855
0.90	1.11	313	332	357	386	465	610	790	945	1,310
0.96	1.04	485	513	553	591	717	972	1,280	1,520	2,060
0.98	1.02	646	684	737	780	951	1,320	1,750	2,080	2,780
0.99	1.01	838	888	958	1,000	1,230	1,760	2,350	2,780	3,630

Magnitude and frequency of seasonal low discharges, based on period of record May 1915 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	15	15	16	18	31	40	50	67
0.02	50	20	20	21	25	46	57	69	93
0.05	20	30	31	33	38	78	95	113	151
0.10	10	43	45	48	55	123	148	172	231
0.20	5	67	72	75	88	208	246	283	379
0.50	2	156	170	182	219	527	613	701	946
0.80	1.25	360	397	437	555	1,210	1,410	1,640	2,240
0.90	1.11	559	617	691	908	1,790	2,100	2,490	3,450
0.96	1.04	891	984	1,130	1,540	2,650	3,150	3,840	5,390
0.98	1.02	1,200	1,330	1,550	2,180	3,370	4,040	5,030	7,140
0.99	1.01	1,580	1,740	2,050	2,980	4,140	5,010	6,370	9,130
		July-August-September				October-November-December			
0.01	100	19	22	26	34	22	24	27	33
0.02	50	24	28	33	43	27	29	33	41
0.05	20	35	41	47	61	37	41	46	57
0.10	10	48	56	64	85	49	55	62	77
0.20	5	72	83	95	127	70	80	91	113
0.50	2	159	182	207	282	143	171	196	244
0.80	1.25	360	406	466	653	303	384	447	560
0.90	1.11	558	625	722	1,030	458	597	704	888
0.96	1.04	897	996	1,160	1,690	722	970	1,160	1,480
0.98	1.02	1,230	1,350	1,590	2,350	976	1,340	1,620	2,080
0.99	1.01	1,630	1,790	2,120	3,170	1,290	1,800	2,210	2,840

05484800 WALNUT CREEK AT DES MOINES, IOWA

LOCATION.—Lat 41°35'14", long 93°42'11", in SW1/4 SE1/4 sec. 2, T78N, R25W, Polk County, Hydrologic Unit 07100006, on left bank, 25 ft downstream from bridge on 63rd Street in Des Moines, and 2.2 mi upstream from Raccoon River.

DRAINAGE AREA.—78.4 mi^2.

PERIOD OF RECORD.—October 1971 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 801.04 ft above sea level (levels by Iowa Natural Resources Council).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,500 ft^3/s, May 10, 1986, gage height, 18.32 ft; no flow many days in 1977, August 21, 1994.

Selected values from rating table number 11, developed October 1991

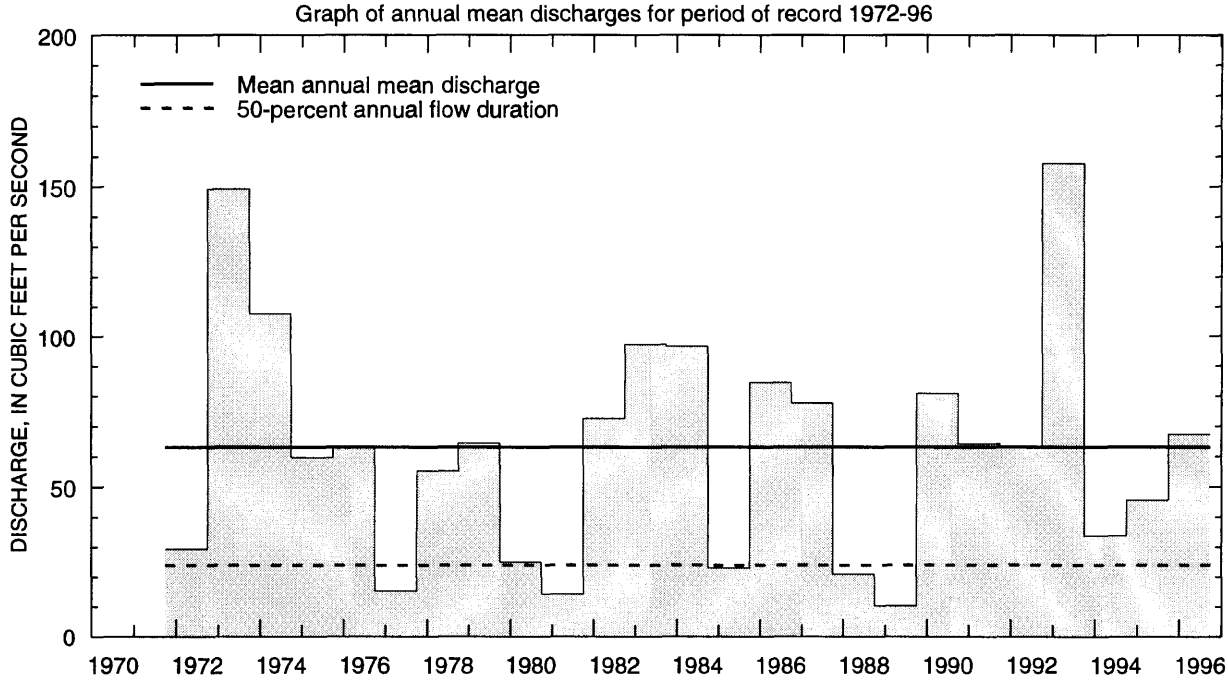
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	19.0	8.0	831
4.0	65.1	10.0	1,420
5.0	195	12.0	2,110
6.0	370	15.0	3,570
7.0	584	17.5	6,300

05484800 WALNUT CREEK AT DES MOINES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1972-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	166	1974	1.33	1972	33.0	46.2
November	147	1973	0.88	1977	38.8	38.5
December	119	1983	0.17	1977	33.2	34.9
January	123	1974	0.001	1977	23.5	28.5
February	172	1973	0.48	1977	42.9	40.9
March	214	1990	3.17	1981	76.1	59.2
April	310	1973	2.72	1981	101	84.7
May	390	1996	6.36	1977	123	105
June	385	1990	7.63	1977	118	94.2
July	427	1993	2.95	1985	84.6	106
August	329	1993	4.37	1976	49.2	66.9
September	214	1993	0.57	1976	33.4	44.0
Annual	158	1993	10.3	1989	63.1	39.0

Graph of annual mean discharges for period of record 1972-96



05484800 WALNUT CREEK AT DES MOINES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1972-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.12	0.62	0.12	0.00	0.00	1.9	1.5	0.75	0.00	0.60	0.07	0.02	0.10
95	0.90	1.2	0.88	0.96	0.90	3.7	2.9	4.1	3.8	1.3	0.40	0.53	1.1
90	1.5	2.3	1.8	1.8	1.7	6.7	6.5	8.2	7.5	2.4	0.90	1.3	2.4
85	2.2	3.6	2.4	3.0	3.9	9.6	13	11	12	5.0	1.6	2.0	4.0
80	3.0	4.8	4.2	3.6	6.0	12	16	14	20	8.2	4.0	3.0	5.8
75	3.7	6.6	6.0	4.4	7.4	15	21	21	26	12	5.4	3.9	7.6
70	4.8	8.5	7.8	5.8	8.8	20	26	35	32	15	7.0	5.1	9.5
60	7.0	14	11	8.0	13	35	44	58	48	22	9.2	7.2	15
50	9.4	20	17	11	19	46	57	79	67	33	14	10	24
40	16	29	25	16	28	61	76	103	87	46	21	14	39
30	24	43	41	28	45	82	100	134	111	66	31	22	58
25	29	50	47	32	51	94	121	146	130	81	36	29	70
20	38	60	55	38	60	108	145	174	153	103	45	43	88
15	66	72	62	46	73	139	172	209	187	133	66	65	111
10	93	103	76	56	100	180	227	273	233	178	99	91	149
5	140	143	106	74	150	260	348	384	362	293	160	140	228

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 25 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	284
0.95	1.05	526
0.90	1.11	728
0.80	1.25	1,080
0.50	2	2,260
0.20	5	4,670
0.10	10	6,810
0.04	25	10,100
0.02	50	13,100
0.01	100	16,400
0.005	200	20,300

Magnitude and frequency of annual high discharges, based on period of record 1972-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	86	57	41	26
0.95	1.05	146	100	73	50
0.90	1.11	193	134	99	69
0.80	1.25	273	189	139	99
0.50	2	537	360	255	188
0.20	5	1,070	669	441	327
0.10	10	1,540	915	574	424
0.04	25	2,280	1,270	748	547
0.02	50	2,950	1,560	879	636
0.01	100	3,730	1,880	1,010	724
0.005	200	4,620	2,220	1,140	809

05484800 WALNUT CREEK AT DES MOINES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1972 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.04	0.11	0.34	0.65
0.02	50	0.00	0.00	0.00	0.00	0.00	0.10	0.24	0.61	1.1
0.05	20	0.00	0.00	0.00	0.01	0.37	0.41	0.74	1.4	2.2
0.10	10	0.00	0.02	0.10	0.16	1.0	1.1	1.7	2.7	4.0
0.20	5	0.07	0.18	0.48	0.67	2.0	3.1	4.2	5.4	7.5
0.50	2	1.2	1.6	2.2	3.7	5.3	11	14	16	21
0.80	1.25	5.9	6.3	7.0	9.6	12	19	29	33	45
0.90	1.11	11	11	12	13	18	22	36	44	61
0.96	1.04	14	15	15	16	18	23	41	56	81
0.98	1.02	16	16	16	17	19	23	43	63	94
0.99	1.01	16	17	17	18	20	24	44	68	106

Magnitude and frequency of seasonal low discharges, based on period of record October 1971 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.64
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.06	1.2
0.05	20	0.39	0.41	0.43	0.64	0.24	0.35	0.40	2.9
0.10	10	0.96	1.1	1.2	1.7	1.4	2.0	3.0	5.9
0.20	5	1.9	2.2	2.5	3.5	4.3	5.8	6.4	13
0.50	2	5.7	6.8	8.0	11	18	23	36	43
0.80	1.25	16	19	22	28	46	55	79	109
0.90	1.11	27	31	36	45	65	76	93	158
0.96	1.04	47	53	59	73	87	99	110	218
0.98	1.02	67	75	80	99	101	113	130	259
0.99	1.01	92	101	106	129	112	124	170	296
		July-August-September				October-November-December			
0.01	100	0.00	0.04	0.18	0.48	0.02	0.04	0.06	0.15
0.02	50	0.00	0.06	0.26	0.66	0.03	0.08	0.12	0.28
0.05	20	0.00	0.14	0.44	1.1	0.10	0.22	0.31	0.65
0.10	10	0.01	0.27	0.72	1.7	0.22	0.48	0.68	1.3
0.20	5	0.10	0.60	1.3	2.8	0.59	1.2	1.6	2.8
0.50	2	1.4	2.6	4.1	7.9	3.0	5.0	6.5	10
0.80	1.25	8.7	11	13	22	12	16	19	27
0.90	1.11	19	21	25	39	22	26	31	41
0.96	1.04	39	44	48	70	39	40	47	61
0.98	1.02	59	69	75	103	52	52	59	75
0.99	1.01	84	103	112	147	63	63	71	89

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA

LOCATION.—Lat 41°34'40", long 93°36'19", in SW1/4 NE1/4 sec. 10, T78N, R24W, Polk County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on Southeast 14th Street at Des Moines, 0.8 mi downstream from Raccoon River and Scott Street Dam, and at mile 200.7.

DRAINAGE AREA.—9,879 mi^2.

PERIOD OF RECORD.—April 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 762.52 ft above sea level. Prior to October 1, 1951, and October 1, 1953 to September 30, 1961, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 116,000 ft^3/s, July 11, 1993, gage height, 34.29 ft; minimum daily discharge, 26 ft^3/s, January 16–29, 1977.

REMARKS.—Flow regulated since April 12, 1977, by dam at Saylorville Lake (station 05481630) 13.0 mi upstream.

Selected values from rating table number 17, developed April 1997

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.0	540	16.0	9,330
10.0	1,160	18.0	13,600
11.0	2,010	21.0	20,100
12.0	3,060	25.0	31,200
13.0	4,330	30.0	59,000
14.0	5,800	35.0	117,000

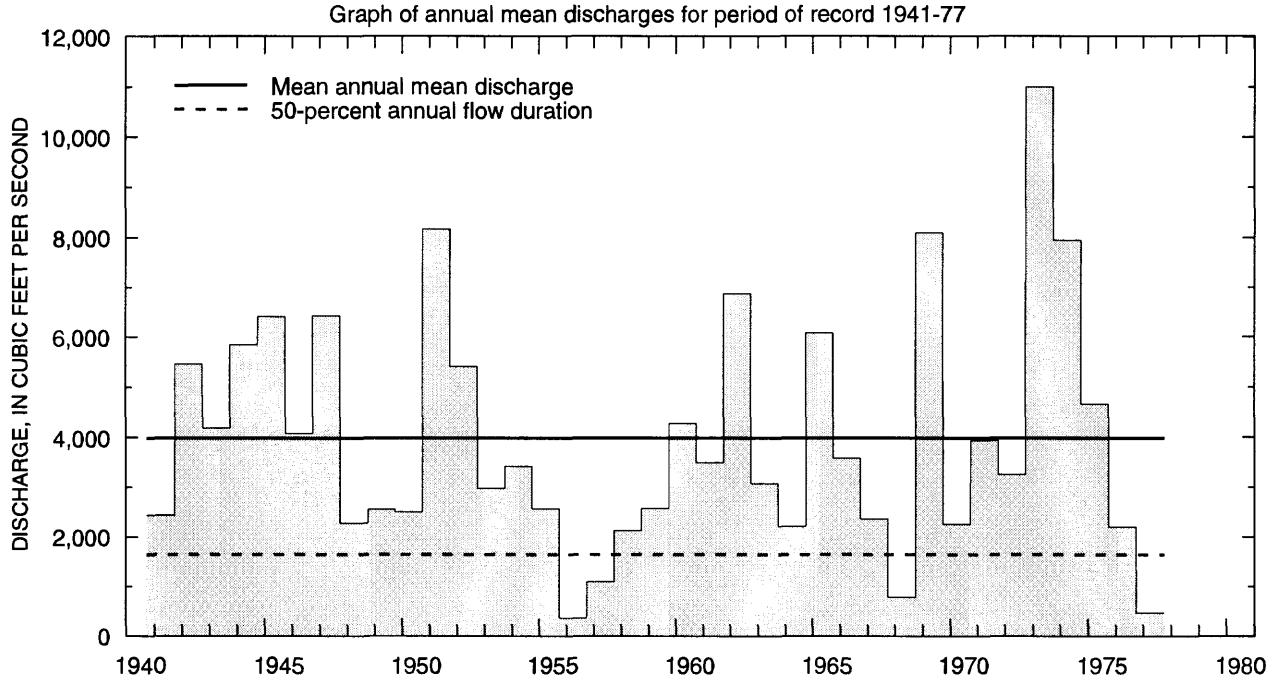
05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1941-77

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	15,170	1974	100	1957	2,048	2,992
November	10,580	1973	127	1956	1,786	2,357
December	5,910	1974	90.5	1956	1,103	1,228
January	5,849	1973	29.2	1977	1,074	1,383
February	7,780	1973	115	1956	1,913	1,908
March	24,800	1973	432	1968	6,312	5,090
April	31,320	1965	575	1977	8,541	8,041
May	22,430	1944	340	1977	7,015	5,321
June	31,660	1947	254	1977	8,677	6,463
July	21,830	1969	148	1977	4,973	4,506
August	8,049	1951	253	1955	2,379	2,222
September	9,089	1962	159	1955	1,933	2,112
Annual	11,000	1973	355	1956	3,982	2,406

Graph of annual mean discharges for period of record 1941-77



05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1941-77

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	71	113	78	26	59	239	285	317	170	92	164	103	91
95	152	174	110	96	115	392	494	492	503	415	284	172	168
90	196	250	170	115	148	570	1,230	800	1,240	826	392	236	264
85	255	285	200	140	215	705	1,540	1,400	1,950	1,050	479	306	348
80	295	330	230	185	280	1,100	1,810	2,180	2,600	1,330	560	367	440
75	334	410	290	240	330	1,390	2,310	2,720	3,310	1,520	650	436	542
70	369	490	350	325	360	1,900	2,900	3,220	3,770	1,770	750	492	670
60	474	635	500	410	493	2,880	4,000	4,030	4,770	2,340	929	629	1,060
50	705	852	674	532	760	4,090	4,860	5,040	5,840	3,170	1,200	876	1,650
40	1,080	1,110	860	640	1,150	5,050	6,780	6,290	7,560	4,160	1,550	1,280	2,610
30	1,730	1,590	1,100	978	2,000	6,800	9,660	7,600	9,650	5,310	2,270	1,740	3,970
25	2,480	2,110	1,300	1,150	2,560	8,400	11,400	8,440	10,900	6,160	2,790	2,070	4,780
20	3,120	2,680	1,610	1,300	3,200	9,640	13,600	9,880	12,900	7,090	3,570	2,610	5,880
15	3,920	3,110	2,000	1,660	3,700	11,200	16,100	11,900	16,000	8,750	4,440	3,280	7,570
10	4,970	4,110	2,600	2,460	4,700	15,400	20,100	15,400	18,900	10,800	5,750	4,520	10,200
5	7,860	7,680	3,690	5,000	7,240	22,400	27,500	21,700	26,200	16,700	8,380	7,080	15,700

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 41 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	10,300
0.90	1.11	13,200
0.80	1.25	17,500
0.50	2	29,000
0.20	5	45,500
0.10	10	56,500
0.04	25	70,300
0.02	50	80,200
0.01	100	90,000
0.005	200	99,500

Magnitude and frequency of annual high discharges, based on period of record 1941-77

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2,990	1,810	1,370	1,010
0.95	1.05	6,710	4,840	3,600	2,720
0.90	1.11	9,770	7,530	5,590	4,270
0.80	1.25	14,600	12,000	8,890	6,850
0.50	2	27,500	23,800	17,800	13,900
0.20	5	43,500	37,200	28,400	22,200
0.10	10	52,100	43,400	33,500	26,100
0.04	25	60,500	48,700	38,100	29,700
0.02	50	65,400	51,300	40,500	31,500
0.01	100	69,300	53,200	42,200	32,800
0.005	200	72,400	54,500	43,500	33,800

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1977

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	26	28	29	29	32	51	69	77	87
0.02	50	35	37	38	39	44	65	86	97	114
0.05	20	51	55	57	60	69	95	120	138	172
0.10	10	72	77	80	86	102	132	163	190	248
0.20	5	108	116	121	132	159	198	239	285	385
0.50	2	225	244	260	290	354	432	526	634	893
0.80	1.25	453	489	544	606	732	945	1,230	1,470	2,060
0.90	1.11	643	692	791	875	1,040	1,430	1,980	2,320	3,180
0.96	1.04	923	987	1,170	1,280	1,480	2,220	3,330	3,840	5,060
0.98	1.02	1,160	1,230	1,500	1,620	1,840	2,950	4,730	5,340	6,820
0.99	1.01	1,420	1,500	1,870	1,990	2,220	3,810	6,530	7,220	8,910

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1977

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	29	29	30	33	79	104	124	186
0.02	50	39	39	40	45	126	162	190	277
0.05	20	61	61	64	72	242	300	348	490
0.10	10	87	91	96	108	412	497	572	785
0.20	5	135	147	156	178	741	872	997	1,340
0.50	2	312	356	383	465	1,920	2,200	2,510	3,300
0.80	1.25	723	835	915	1,220	4,050	4,590	5,310	7,030
0.90	1.11	1,120	1,290	1,430	2,010	5,550	6,310	7,370	9,900
0.96	1.04	1,800	2,030	2,270	3,450	7,380	8,450	10,000	13,700
0.98	1.02	2,440	2,710	3,060	4,890	8,630	9,960	11,900	16,600
0.99	1.01	3,210	3,500	3,980	6,700	9,780	11,400	13,700	19,400
		July-August-September				October-November-December			
0.01	100	37	56	70	103	53	53	57	63
0.02	50	50	72	88	127	62	65	70	77
0.05	20	77	104	125	178	80	88	96	108
0.10	10	113	146	171	240	102	117	130	148
0.20	5	180	220	253	351	142	169	192	222
0.50	2	425	490	549	744	292	371	429	511
0.80	1.25	981	1,110	1,230	1,650	680	895	1,050	1,290
0.90	1.11	1,500	1,700	1,910	2,540	1,110	1,480	1,750	2,170
0.96	1.04	2,350	2,710	3,080	4,080	1,970	2,610	3,100	3,890
0.98	1.02	3,120	3,670	4,230	5,580	2,910	3,830	4,560	5,770
0.99	1.01	4,030	4,830	5,640	7,430	4,190	5,470	6,530	8,310

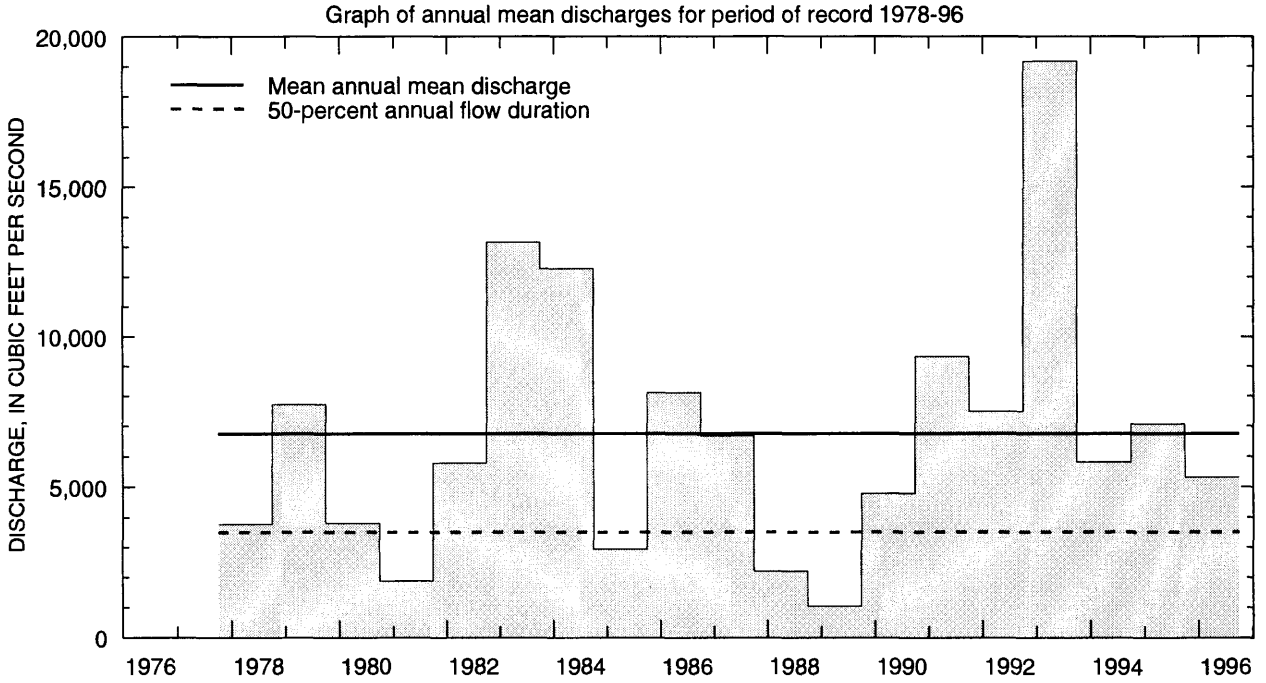
05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1978-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	15,060	1987	474	1990	3,542	3,537
November	10,610	1993	363	1990	3,709	3,176
December	9,045	1983	342	1990	3,182	2,772
January	6,439	1983	310	1981	1,952	1,721
February	12,400	1984	343	1978	3,138	3,454
March	23,530	1983	560	1981	8,399	5,913
April	27,620	1993	1,082	1981	11,260	8,391
May	28,190	1993	1,794	1981	11,630	8,525
June	35,240	1984	1,716	1988	12,930	10,180
July	55,960	1993	739	1988	11,380	12,090
August	26,050	1993	441	1988	5,627	5,738
September	21,430	1993	434	1988	4,121	4,918
Annual	19,180	1993	1,036	1989	6,754	4,428

Graph of annual mean discharges for period of record 1978-96



05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1978-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	380	307	302	240	294	269	521	747	733	540	321	372	320
95	501	445	370	330	340	422	1,040	1,270	1,390	700	386	446	436
90	652	724	544	390	399	781	1,450	2,420	2,270	1,070	470	742	617
85	784	874	726	485	430	1,910	2,430	2,820	2,970	1,600	793	940	898
80	928	1,040	880	530	501	2,430	3,430	3,560	3,510	2,310	1,370	1,080	1,190
75	1,060	1,320	1,040	595	570	2,840	3,870	4,280	4,020	3,360	1,740	1,230	1,500
70	1,260	1,590	1,230	710	620	3,160	4,400	4,700	4,960	4,680	2,250	1,380	1,790
60	1,750	1,910	1,600	1,040	1,200	4,290	6,140	6,030	6,850	6,440	3,110	1,730	2,540
50	2,190	2,280	1,970	1,400	1,720	5,850	8,390	8,070	9,020	8,310	3,760	2,190	3,510
40	2,830	2,920	2,690	1,740	2,180	7,700	10,500	12,000	12,500	10,300	4,680	2,580	4,880
30	3,800	4,180	3,760	2,300	2,690	10,400	15,900	17,200	16,000	12,900	5,770	3,310	7,150
25	4,340	5,160	4,480	2,790	2,920	12,100	18,700	19,000	18,200	14,200	6,820	3,790	8,620
20	5,200	6,640	5,330	3,050	3,480	15,300	21,300	20,700	20,700	15,200	8,120	5,010	10,700
15	6,450	8,050	6,080	3,450	4,900	17,100	23,500	22,800	24,100	17,000	9,480	6,620	13,900
10	8,290	9,300	6,990	3,750	7,620	20,200	25,500	25,200	30,400	20,400	12,400	11,800	18,300
5	11,000	10,500	8,900	5,690	12,500	24,500	27,500	28,500	38,000	35,600	22,000	17,900	24,300

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05485500 DES MOINES RIVER BELOW RACCOON RIVER AT DES MOINES, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1978 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	135	142	144	150	163	184	215	230	250
0.02	50	165	173	175	177	201	235	276	300	341
0.05	20	222	231	236	241	276	334	397	417	532
0.10	10	287	298	306	318	365	453	544	595	772
0.20	5	390	402	419	442	510	647	785	898	1,180
0.50	2	684	703	756	824	962	1,230	1,520	1,860	2,430
0.80	1.25	1,170	1,200	1,350	1,510	1,800	2,240	2,820	3,540	4,520
0.90	1.11	1,530	1,570	1,810	2,070	2,490	3,000	3,810	4,820	6,010
0.96	1.04	2,030	2,090	2,470	2,870	3,510	4,040	5,190	6,550	7,930
0.98	1.02	2,420	2,490	3,020	3,550	4,370	4,860	6,290	7,890	9,330
0.99	1.01	2,820	2,920	3,610	4,280	5,330	5,710	7,430	9,260	10,700

Magnitude and frequency of seasonal low discharges, based on period of record
October 1977 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	110	129	133	142	201	285	374	506
0.02	50	139	159	164	178	290	400	510	675
0.05	20	197	219	227	250	492	656	806	1,040
0.10	10	267	291	306	340	776	1,000	1,200	1,510
0.20	5	387	416	441	496	1,320	1,650	1,920	2,370
0.50	2	780	836	911	1,030	3,430	4,080	4,610	5,510
0.80	1.25	1,560	1,720	1,940	2,200	8,260	9,450	10,600	12,600
0.90	1.11	2,240	2,540	2,920	3,290	12,700	14,300	16,200	19,200
0.96	1.04	3,280	3,880	4,570	5,080	19,600	21,800	25,200	29,900
0.98	1.02	4,190	5,120	6,130	6,750	25,700	28,300	33,300	39,700
0.99	1.01	5,220	6,590	8,010	8,730	32,500	35,600	42,500	51,100
		July-August-September				October-November-December			
0.01	100	299	299	320	352	174	222	227	233
0.02	50	318	324	350	402	210	266	279	297
0.05	20	359	377	394	503	279	351	381	425
0.10	10	413	446	485	629	359	451	504	580
0.20	5	514	572	647	853	487	614	707	842
0.50	2	930	1,080	1,280	1,700	877	1,130	1,360	1,680
0.80	1.25	2,190	2,610	3,060	3,970	1,590	2,110	2,640	3,270
0.90	1.11	3,860	4,590	5,220	6,590	2,170	2,950	3,740	4,590
0.96	1.04	7,740	9,100	9,840	11,900	3,030	4,250	5,440	6,540
0.98	1.02	12,800	14,900	15,400	18,000	3,770	5,400	6,930	8,180
0.99	1.01	20,900	23,900	25,000	26,500	4,580	6,710	8,630	9,980

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05485640 FOURMILE CREEK AT DES MOINES, IOWA

LOCATION.—Lat 41°36'50", long 93°32'43", in NE1/4 NE1/4 sec. 32, T79N, R23W, Polk County, Hydrologic Unit 07100008, on right bank 20 ft downstream from bridge on Easton Blvd., 4.4 mi downstream from Muchikinock Creek and 5.0 mi upstream from Des Moines River.

DRAINAGE AREA.—92.7 mi^2.

PERIOD OF RECORD.—October 1971 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 795.87 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 5,340 ft^3/s, June 9, 1974, gage height, 14.84 ft; no flow many days in 1977.

Selected values from rating table number 9, developed March 1995

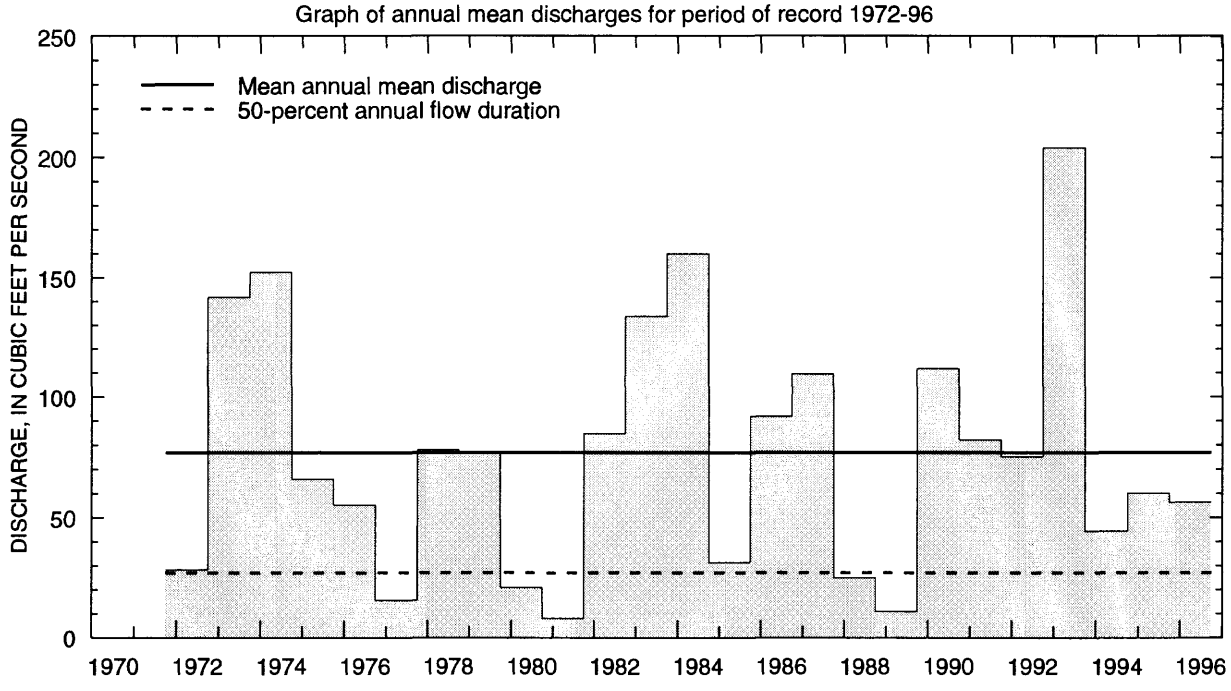
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	3.34	8.0	893
4.0	20.8	9.0	1,180
5.0	125	10.0	1,500
6.0	328	12.0	2,230
7.0	640	15.0	5,600

05485640 FOURMILE CREEK AT DES MOINES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1972-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	258	1987	1.36	1989	44.4	69.9
November	317	1984	1.57	1977	48.1	66.5
December	124	1983	0.25	1977	36.8	38.3
January	118	1974	0.001	1977	24.7	28.1
February	206	1973	0.55	1977	48.3	49.7
March	292	1979	4.04	1981	103	84.8
April	354	1973	3.67	1981	127	109
May	462	1974	6.67	1977	144	116
June	500	1974	0.73	1977	150	146
July	607	1993	0.074	1977	104	141
August	363	1993	1.66	1988	51.7	82.7
September	270	1993	1.37	1988	40.9	61.7
Annual	204	1993	7.97	1981	76.9	51.7

Graph of annual mean discharges for period of record 1972-96



05485640 FOURMILE CREEK AT DES MOINES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1972-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.28	0.52	0.18	0.00	0.00	2.3	1.6	1.7	0.00	0.00	0.00	0.54	0.00
95	0.99	1.5	0.86	0.88	0.88	4.1	2.8	4.6	2.9	1.0	0.97	0.93	1.3
90	1.4	3.0	2.3	1.8	1.6	5.4	4.2	13	6.1	2.4	1.7	1.5	2.6
85	2.1	3.6	2.8	2.7	2.9	12	15	17	9.8	3.8	2.6	2.3	3.8
80	3.6	4.9	3.7	3.3	5.7	16	22	21	17	6.2	3.6	3.1	5.6
75	4.4	6.0	5.0	5.0	8.8	20	27	27	28	9.3	4.9	4.0	7.2
70	5.4	7.2	7.2	6.7	11	24	32	36	37	13	6.3	5.0	9.5
60	6.4	12	11	10	15	40	49	66	54	23	9.6	7.0	16
50	7.5	23	17	13	22	56	64	93	70	34	13	8.8	27
40	13	32	30	18	30	73	95	115	91	45	18	12	41
30	29	48	46	30	40	100	129	147	128	67	30	22	64
25	34	57	56	34	50	117	153	176	150	83	37	29	79
20	53	71	63	39	62	145	183	213	182	111	46	44	102
15	91	85	69	44	84	183	224	261	223	155	66	71	133
10	124	120	80	58	120	242	297	335	313	263	119	114	185
5	196	185	116	80	170	371	414	471	557	441	207	198	298

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 24 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	729
0.90	1.11	951
0.80	1.25	1,300
0.50	2	2,260
0.20	5	3,760
0.10	10	4,820
0.04	25	6,200
0.02	50	7,250
0.01	100	8,290
0.005	200	9,350

Magnitude and frequency of annual high discharges, based on period of record 1972-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	58	33	28	19
0.95	1.05	136	88	68	47
0.90	1.11	207	139	104	72
0.80	1.25	333	231	166	116
0.50	2	740	525	355	249
0.20	5	1,440	997	642	451
0.10	10	1,950	1,300	825	577
0.04	25	2,590	1,660	1,030	720
0.02	50	3,060	1,900	1,170	813
0.01	100	3,510	2,110	1,290	894
0.005	200	3,940	2,290	1,400	965

05485640 FOURMILE CREEK AT DES MOINES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1972 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.02	0.12	0.40	0.59
0.02	50	0.00	0.00	0.00	0.00	0.00	0.06	0.25	0.65	0.95
0.05	20	0.00	0.00	0.00	0.00	0.00	0.23	0.63	1.3	1.9
0.10	10	0.07	0.12	0.23	0.51	0.57	0.64	1.3	2.3	3.4
0.20	5	0.41	0.56	0.79	1.2	1.7	1.8	3.0	4.5	6.4
0.50	2	2.1	2.4	2.8	3.5	5.7	8.4	11	14	20
0.80	1.25	5.8	6.3	7.2	9.1	14	21	27	36	51
0.90	1.11	8.9	9.7	11	15	21	28	40	57	80
0.96	1.04	13	14	17	26	33	40	54	88	122
0.98	1.02	16	18	23	37	43	55	64	114	157
0.99	1.01	18	21	29	51	55	65	73	141	195

Magnitude and frequency of seasonal low discharges, based on period of record October 1971 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.52
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.39	1.1
0.05	20	0.08	0.16	0.24	0.38	0.28	0.40	1.2	2.9
0.10	10	0.52	0.81	1.1	1.4	1.7	2.4	3.0	6.3
0.20	5	1.7	2.3	2.7	3.5	5.2	7.0	7.9	14
0.50	2	7.6	9.0	9.8	12	22	28	33	50
0.80	1.25	20	23	25	32	56	68	84	118
0.90	1.11	28	33	36	48	80	94	117	161
0.96	1.04	38	44	51	71	105	121	151	206
0.98	1.02	43	52	62	89	121	138	170	232
0.99	1.01	48	59	72	107	134	151	185	252
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.02	0.06	0.15	0.21
0.02	50	0.00	0.00	0.00	0.00	0.05	0.12	0.24	0.36
0.05	20	0.07	0.28	0.58	0.87	0.14	0.29	0.49	0.75
0.10	10	0.25	0.60	1.0	1.6	0.33	0.60	0.90	1.4
0.20	5	0.61	1.1	1.7	2.7	0.90	1.4	1.8	2.9
0.50	2	2.6	3.5	4.7	7.6	4.4	5.6	6.4	10
0.80	1.25	9.5	11	15	23	15	18	20	30
0.90	1.11	18	22	29	44	25	29	36	50
0.96	1.04	35	45	61	92	40	47	63	83
0.98	1.02	52	73	104	152	51	62	89	113
0.99	1.01	76	115	171	245	63	78	120	147

05486000 NORTH RIVER NEAR NORWALK, IOWA

LOCATION.—Lat 41°27'25", long 93°39'10", in NW1/4 SW1/4 sec. 20, T77N, R24W, Warren County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on County Highway R57, 1.7 mi southeast of Norwalk, 5.2 mi upstream from Middle Creek, and 6.2 mi downstream from Badger Creek.

DRAINAGE AREA.—349 mi^2.

PERIOD OF RECORD.—February 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 788.45 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to June 12, 1946, nonrecording gage at same site and datum. January 7 to October 11, 1960, nonrecording gage at site 2.1 mi upstream at different datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 32,000 ft^3/s, June 13, 1947, gage height, 25.30 ft, from flood mark and rating curve extended above 9,100 ft^3/s on basis of velocity-area analysis; no flow many days during 1954–57.

Selected values from rating table number 15, developed October 1992

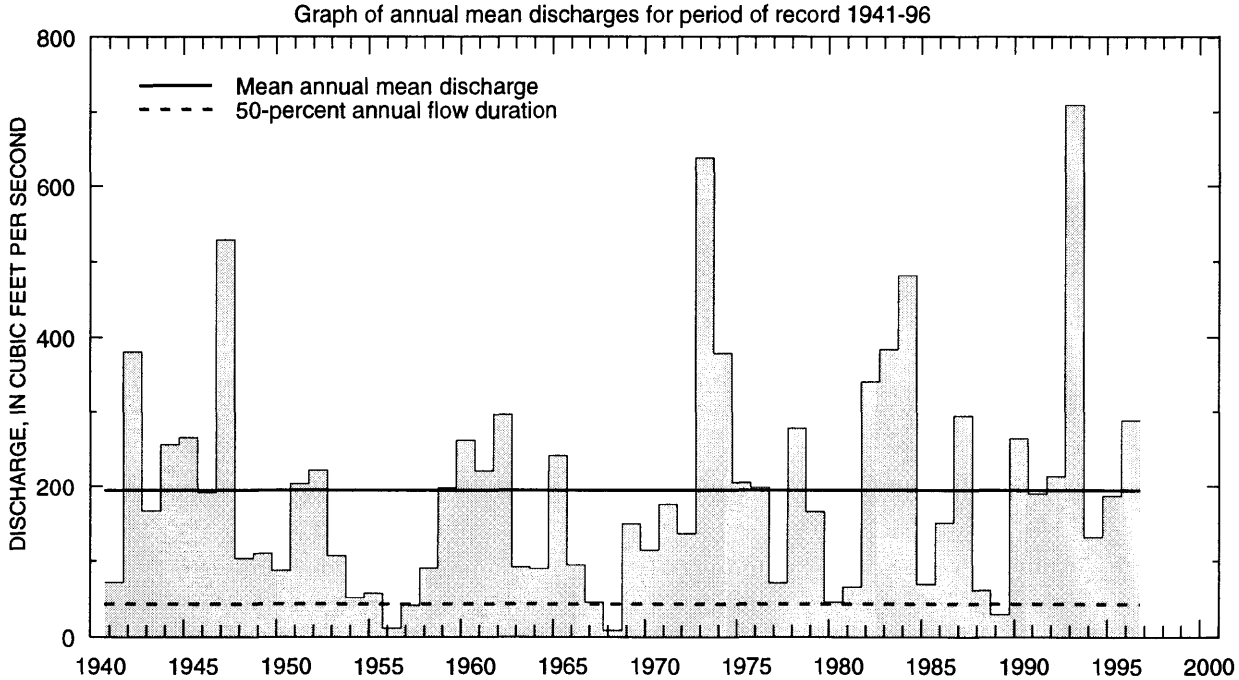
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	27.5	12.0	660
6.0	27.5	15.0	1,260
7.0	85.6	18.0	2,010
8.0	145	21.0	3,080
9.0	230	24.0	11,500
10.0	352	25.5	22,500

05486000 NORTH RIVER NEAR NORWALK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	593	1987	0.20	1950	80.1	145
November	747	1973	0.37	1956	101	159
December	567	1993	0.36	1956	76.2	121
January	739	1973	0.38	1954	80.7	140
February	911	1973	3.21	1956	162	175
March	1,041	1965	3.90	1954	341	282
April	1,401	1973	1.22	1956	348	372
May	1,699	1996	3.71	1967	356	377
June	3,260	1947	1.58	1977	379	513
July	1,722	1993	1.10	1977	197	289
August	1,185	1993	0.21	1968	118	207
September	1,007	1993	0.26	1957	97.0	170
Annual	709	1993	8.08	1968	195	149

Graph of annual mean discharges for period of record 1941-96



05486000 NORTH RIVER NEAR NORWALK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.16	0.40	0.30	0.90	2.8	1.1	1.0	0.58	0.10	0.00	0.00	0.10
95	0.14	0.70	1.1	0.87	2.0	6.2	6.9	4.0	3.2	0.87	0.38	0.30	0.80
90	0.30	1.4	1.8	1.4	3.7	12	16	7.9	8.3	4.1	1.1	0.55	2.2
85	0.63	2.2	2.3	2.5	6.1	20	25	16	18	7.1	3.0	1.0	4.3
80	1.3	4.0	3.6	4.3	8.6	32	35	31	28	11	4.7	1.8	7.2
75	2.7	8.1	5.8	6.3	12	45	45	43	44	16	6.4	3.2	10
70	4.5	11	8.0	8.0	18	63	55	64	58	21	8.8	4.5	14
60	8.6	18	13	13	29	92	87	111	85	34	13	7.7	26
50	16	25	18	21	43	130	136	165	129	52	20	12	43
40	29	35	30	32	71	204	213	239	180	82	30	22	75
30	42	57	57	58	125	292	293	323	262	126	50	41	130
25	55	100	80	79	160	351	346	374	332	158	64	58	170
20	70	147	115	100	200	453	433	450	425	201	83	84	223
15	113	191	150	120	253	581	554	559	596	253	113	120	300
10	197	269	193	170	400	806	806	837	916	395	185	190	446
5	350	452	287	300	789	1,480	1,440	1,480	1,490	911	428	424	851

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	466
0.95	1.05	847
0.90	1.11	1,160
0.80	1.25	1,700
0.50	2	3,470
0.20	5	7,030
0.10	10	10,100
0.04	25	14,800
0.02	50	19,000
0.01	100	23,700
0.005	200	28,900

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	278	164	103	61
0.95	1.05	576	361	232	145
0.90	1.11	824	527	340	219
0.80	1.25	1,240	802	520	343
0.50	2	2,460	1,600	1,040	713
0.20	5	4,420	2,790	1,790	1,260
0.10	10	5,770	3,550	2,250	1,600
0.04	25	7,440	4,420	2,780	1,990
0.02	50	8,650	5,000	3,120	2,240
0.01	100	9,810	5,530	3,420	2,460
0.005	200	10,900	6,010	3,690	2,650

05486000 NORTH RIVER NEAR NORWALK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.08	0.12	0.15	0.42
0.02	50	0.00	0.00	0.00	0.00	0.01	0.15	0.23	0.29	0.76
0.05	20	0.00	0.00	0.00	0.00	0.11	0.37	0.58	0.74	1.8
0.10	10	0.04	0.05	0.08	0.11	0.29	0.77	1.3	1.6	3.6
0.20	5	0.22	0.26	0.35	0.42	0.80	1.8	3.0	3.9	7.9
0.50	2	1.6	1.8	2.2	2.8	4.3	8.0	14	18	31
0.80	1.25	8.0	8.5	9.7	12	18	30	49	62	99
0.90	1.11	17	18	20	24	37	57	88	111	169
0.96	1.04	37	38	41	47	74	108	155	191	282
0.98	1.02	60	60	64	71	114	159	217	264	382
0.99	1.01	92	92	96	101	166	221	287	345	492

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.13	0.15	0.17	0.26	0.05	0.19	0.33	0.86
0.02	50	0.22	0.26	0.29	0.47	0.13	0.40	0.65	1.6
0.05	20	0.48	0.57	0.66	1.1	0.49	1.1	1.7	3.9
0.10	10	0.94	1.1	1.3	2.3	1.4	2.6	3.9	8.1
0.20	5	2.1	2.5	2.9	5.4	4.3	6.7	9.5	19
0.50	2	8.5	11	12	23	26	31	43	76
0.80	1.25	32	39	47	80	95	109	151	249
0.90	1.11	61	75	90	144	159	187	263	424
0.96	1.04	119	144	174	255	247	308	445	707
0.98	1.02	180	215	263	360	310	408	602	952
0.99	1.01	259	306	375	482	369	512	774	1,220
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.05
0.02	50	0.00	0.00	0.00	0.14	0.00	0.00	0.01	0.11
0.05	20	0.00	0.00	0.06	0.34	0.02	0.04	0.10	0.29
0.10	10	0.06	0.11	0.19	0.72	0.14	0.21	0.33	0.69
0.20	5	0.33	0.50	0.64	1.7	0.56	0.79	1.1	1.9
0.50	2	2.5	3.2	4.3	8.5	4.4	5.9	7.4	11
0.80	1.25	12	15	20	36	24	30	38	51
0.90	1.11	26	31	41	74	51	64	82	105
0.96	1.04	54	65	80	154	109	132	175	217
0.98	1.02	85	104	118	241	171	205	277	338
0.99	1.01	128	157	163	356	253	300	409	492

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

LOCATION.—Lat 41°25'27", long 93°35'09", in SW/14 SE1/4 sec. 35, T77N, R24W, Warren County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on county highway, 0.4 mi upstream from Cavitt Creek, 1.5 mi upstream from bridge on U.S. Highway 69, and 4.6 mi northwest of Indianola.

DRAINAGE AREA.—503 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 776.15 ft above sea level (U.S. Army Corps of Engineers bench mark). Prior to June 11, 1946, June 9, 1947 to November 23, 1948, and September 8, 1951 to October 30, 1952, nonrecording gage; and June 11, 1946 to June 8, 1947 (destroyed by flood), November 24, 1948 to September 7, 1951, October 31, 1952 to September 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 34,000 ft^3/s, June 13, 1947, gage height, 28.27 ft present datum, from flood mark; minimum daily discharge, 0.11 ft^3/s, July 2, 1977.

Selected values from rating table number 18, developed February 1997

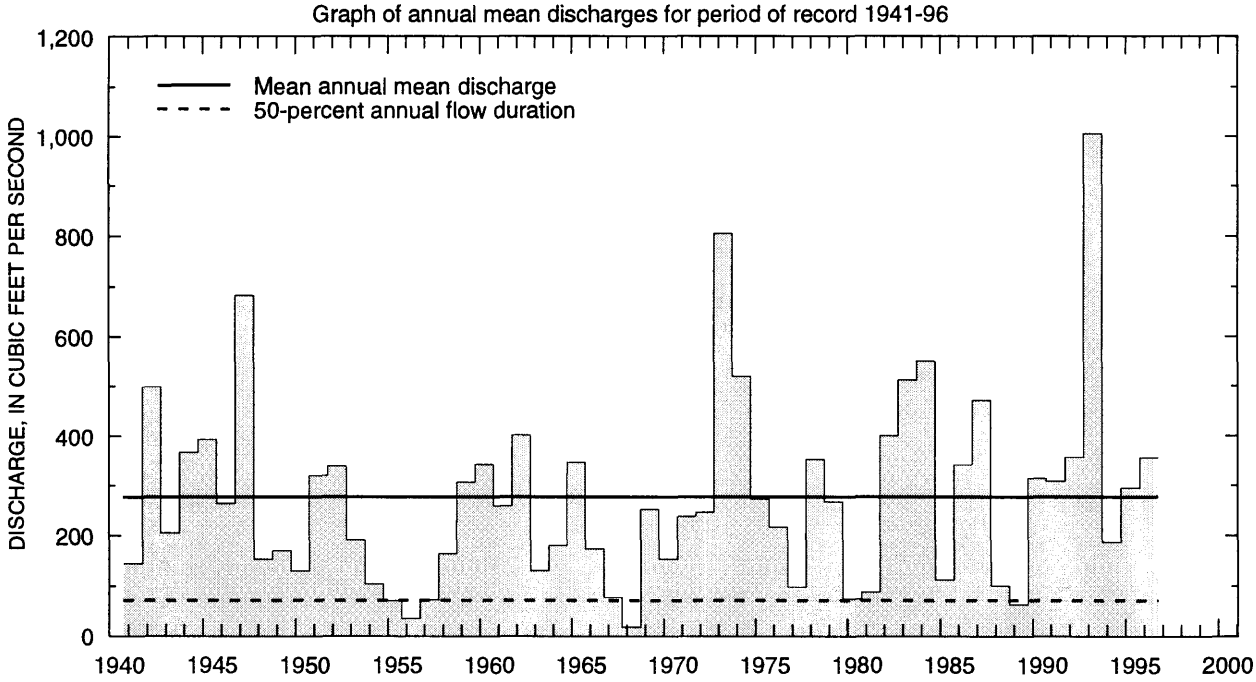
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	37.1	12.0	2,080
7.0	170	15.0	4,060
8.0	455	18.0	6,690
9.0	753	21.0	9,060
10.0	1,120	24.0	16,500

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	928	1974	4.28	1969	119	207
November	961	1973	2.80	1956	137	206
December	1,070	1983	1.62	1956	120	205
January	646	1973	1.02	1977	109	160
February	1,415	1973	4.68	1977	234	249
March	1,417	1962	7.35	1954	474	385
April	1,983	1973	4.81	1956	486	483
May	2,053	1996	10.1	1956	507	485
June	4,094	1947	3.81	1977	508	609
July	3,121	1993	5.20	1977	270	450
August	1,419	1993	4.47	1968	176	280
September	1,460	1992	3.92	1968	185	300
Annual	1,006	1993	17.8	1968	277	191

Graph of annual mean discharges for period of record 1941-96



05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.2	2.4	1.5	0.92	2.0	6.4	4.2	4.6	3.5	1.5	1.9	1.8	1.9
95	3.4	5.1	3.8	2.1	4.5	12	19	12	12	9.4	5.2	4.5	4.9
90	4.6	7.1	5.8	3.9	6.4	26	34	21	24	17	11	6.8	8.3
85	5.5	9.0	8.0	6.4	9.6	41	50	37	39	24	14	8.3	12
80	7.2	11	10	9.0	14	54	65	59	56	32	19	10	17
75	9.2	17	13	12	19	74	77	84	72	37	22	13	22
70	12	20	15	14	27	98	91	107	92	45	26	16	28
60	18	29	21	21	42	135	128	160	125	63	33	21	45
50	27	40	30	33	67	198	200	226	176	83	44	29	71
40	42	55	50	50	110	274	285	312	246	116	56	44	112
30	73	83	75	76	190	400	389	434	360	161	78	74	181
25	88	121	109	105	233	473	465	519	448	200	93	104	233
20	113	169	150	140	293	599	609	642	575	241	119	152	300
15	157	224	198	170	380	819	778	842	776	326	164	228	413
10	244	303	263	240	580	1,150	1,110	1,230	1,130	499	271	350	615
5	463	579	434	370	1,090	2,010	1,970	1,970	2,000	1,150	592	659	1,150

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,710
0.90	1.11	3,440
0.80	1.25	4,540
0.50	2	7,360
0.20	5	11,300
0.10	10	13,900
0.04	25	17,100
0.02	50	19,400
0.01	100	21,500
0.005	200	23,600

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	520	324	209	131
0.95	1.05	1,050	656	423	270
0.90	1.11	1,460	916	591	381
0.80	1.25	2,110	1,320	851	558
0.50	2	3,860	2,370	1,530	1,040
0.20	5	6,210	3,700	2,410	1,710
0.10	10	7,610	4,450	2,900	2,120
0.04	25	9,150	5,240	3,420	2,570
0.02	50	10,100	5,720	3,750	2,860
0.01	100	11,000	6,120	4,020	3,120
0.005	200	11,800	6,470	4,260	3,350

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.18	0.28	0.35	0.50	0.80	1.2	1.5	1.7	2.6
0.02	50	0.30	0.43	0.54	0.72	1.1	1.7	2.1	2.5	3.7
0.05	20	0.63	0.82	0.98	1.2	1.8	2.8	3.5	4.2	6.4
0.10	10	1.2	1.4	1.6	2.0	2.8	4.3	5.5	6.7	10
0.20	5	2.4	2.7	3.0	3.5	4.7	7.1	9.5	12	18
0.50	2	7.8	8.1	8.8	9.9	13	19	26	33	53
0.80	1.25	21	22	24	26	34	49	73	90	147
0.90	1.11	33	35	38	43	57	81	122	151	249
0.96	1.04	50	55	62	72	97	137	210	259	431
0.98	1.02	64	73	83	99	138	192	298	367	612
0.99	1.01	79	93	108	132	188	259	407	499	836

Magnitude and frequency of seasonal low discharges, based on period of record March 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.59	0.61	0.66	0.84	0.83	1.2	1.8	3.1
0.02	50	0.87	0.89	1.0	1.3	1.5	2.2	3.0	5.2
0.05	20	1.6	1.7	1.9	2.7	3.6	4.9	6.4	11
0.10	10	2.6	2.9	3.3	4.8	7.2	9.4	12	20
0.20	5	4.9	5.6	6.4	9.7	15	19	24	39
0.50	2	16	19	21	34	51	62	78	126
0.80	1.25	48	58	67	110	126	152	206	346
0.90	1.11	87	102	120	197	182	222	316	550
0.96	1.04	162	184	218	356	251	312	474	861
0.98	1.02	240	267	318	515	298	376	599	1,120
0.99	1.01	341	370	443	711	341	436	726	1,400
		July-August-September				October-November-December			
0.01	100	0.26	0.81	1.3	2.7	0.42	0.55	0.68	1.3
0.02	50	0.45	1.2	1.7	3.3	0.62	0.80	0.98	1.8
0.05	20	0.99	1.9	2.7	4.7	1.1	1.4	1.7	2.9
0.10	10	1.9	3.0	3.9	6.5	1.9	2.3	2.7	4.4
0.20	5	3.9	5.2	6.4	9.9	3.5	4.1	4.9	7.4
0.50	2	13	14	16	24	11	13	16	21
0.80	1.25	35	37	43	66	36	42	52	66
0.90	1.11	53	61	72	116	65	78	97	122
0.96	1.04	78	102	125	219	122	150	192	240
0.98	1.02	98	141	180	338	182	229	300	376
0.99	1.01	118	188	251	505	261	336	449	567

05487470 SOUTH RIVER NEAR ACKWORTH, IOWA

LOCATION.—Lat 41°20'14", long 93°29'10", in SE1/4 SE1/4 sec. 34, T76N, R23W, Warren County, Hydrologic Unit 07100008, on right bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Otter Creek, and 2.2 mi southwest of Ackworth.

DRAINAGE AREA.—460 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 769.97 ft above sea level. Prior to June 12, 1946, nonrecording gage, June 13, 1946 to April 13, 1960, water-stage recorder, and April 14, 1960 to September 30, 1961, nonrecording gage, at site 4.0 mi downstream at datum 8.06 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 38,100 ft^3/s, June 17, 1990, gage height, 31.25 ft; maximum gage height, 32.85 ft, July 5, 1981; no flow September 19–October 13, 1956.

Selected values from rating table number 22, developed October 1996

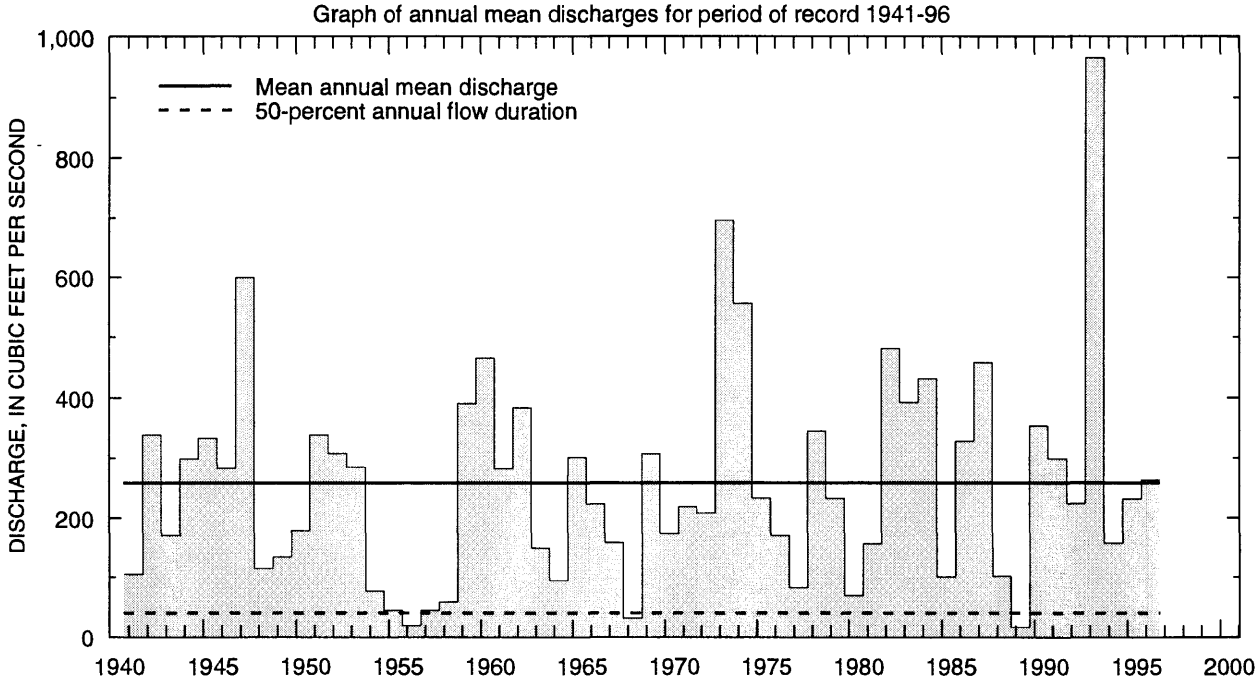
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.7	10.7	12.0	2,440
7.0	152	15.0	5,750
8.0	393	18.0	9,320
9.0	734	21.0	11,900
10.0	1,170	25.0	19,500
11.0	1,694	31.0	37,000

05487470 SOUTH RIVER NEAR ACKWORTH, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,283	1974	0.35	1957	115	242
November	906	1962	1.05	1957	129	195
December	1,022	1983	0.88	1956	115	199
January	901	1974	1.05	1956	107	185
February	1,209	1973	3.70	1989	222	244
March	1,568	1960	3.61	1957	445	411
April	1,937	1973	1.70	1956	451	452
May	1,962	1959	7.14	1980	464	473
June	4,305	1947	1.79	1977	488	653
July	3,870	1993	1.48	1977	267	598
August	1,546	1993	2.02	1957	136	275
September	1,332	1993	1.05	1957	163	277
Annual	966	1993	16.1	1989	258	180

Graph of annual mean discharges for period of record 1941-96



05487470 SOUTH RIVER NEAR ACKWORTH, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.39	0.90	0.70	0.50	1.2	2.1	1.4	1.1	0.84	0.70	1.0	0.10	0.80
95	1.2	1.7	1.7	1.3	1.8	4.2	5.5	5.6	3.5	2.2	1.8	1.5	1.9
90	1.7	2.6	2.3	2.0	3.1	10	15	11	7.0	4.4	2.9	2.3	3.0
85	2.3	3.2	2.9	3.1	4.5	20	28	19	11	6.9	4.2	3.3	4.4
80	2.8	3.8	3.5	4.4	6.4	31	41	30	17	9.5	5.3	3.9	5.8
75	3.4	5.1	4.7	5.3	14	46	52	44	24	12	6.5	4.5	8.0
70	4.0	6.4	6.0	7.2	20	59	62	60	33	15	7.2	5.0	11
60	5.5	10	12	14	37	95	95	90	53	20	9.0	6.7	21
50	7.9	18	23	22	60	135	151	128	88	29	13	8.9	40
40	18	45	40	40	90	197	210	183	138	44	19	14	70
30	40	78	66	67	145	297	288	269	216	72	30	28	119
25	51	100	82	90	178	379	360	342	286	96	41	43	155
20	70	131	114	110	212	515	470	462	387	128	57	75	210
15	96	183	168	140	303	724	671	652	604	198	88	128	300
10	175	266	225	170	498	1,160	1,080	1,060	1,020	381	144	243	493
5	395	525	371	310	955	2,010	2,080	2,240	2,130	1,100	445	641	1,100

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,620
0.95	1.05	3,030
0.90	1.11	4,140
0.80	1.25	5,890
0.50	2	10,900
0.20	5	18,400
0.10	10	23,600
0.04	25	29,900
0.02	50	34,500
0.01	100	38,900
0.005	200	43,200

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	718	347	182	100
0.95	1.05	1,300	691	393	232
0.90	1.11	1,760	965	568	345
0.80	1.25	2,480	1,400	849	533
0.50	2	4,510	2,600	1,630	1,070
0.20	5	7,660	4,320	2,710	1,820
0.10	10	9,830	5,390	3,350	2,260
0.04	25	12,600	6,640	4,060	2,740
0.02	50	14,600	7,480	4,500	3,040
0.01	100	16,600	8,240	4,890	3,300
0.005	200	18,600	8,940	5,230	3,520

05487470 SOUTH RIVER NEAR ACKWORTH, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.08	0.46	0.50	0.51	0.80
0.02	50	0.07	0.10	0.17	0.24	0.44	0.64	0.72	0.76	1.3
0.05	20	0.28	0.34	0.46	0.60	0.80	1.1	1.3	1.5	2.6
0.10	10	0.50	0.59	0.74	0.92	1.1	1.7	2.1	2.6	4.7
0.20	5	0.93	1.1	1.3	1.5	1.7	2.9	3.8	5.2	9.5
0.50	2	2.8	3.0	3.3	3.9	6.4	9.1	13	19	35
0.80	1.25	7.7	8.1	8.9	10	18	30	46	71	123
0.90	1.11	13	14	15	18	27	57	92	141	230
0.96	1.04	22	23	26	32	50	115	195	291	441
0.98	1.02	31	33	38	47	70	183	318	463	663
0.99	1.01	42	45	54	67	110	281	498	704	952

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.25	0.26	0.28	0.37	0.18	0.37	0.47	0.75
0.02	50	0.39	0.42	0.45	0.63	0.35	0.65	0.85	1.5
0.05	20	0.75	0.82	0.92	1.4	0.88	1.5	2.0	3.8
0.10	10	1.3	1.5	1.7	2.7	1.9	2.9	4.0	8.4
0.20	5	2.6	3.0	3.5	5.8	4.3	6.1	8.9	20
0.50	2	9.7	11	14	24	16	22	35	84
0.80	1.25	34	40	49	88	48	65	108	267
0.90	1.11	66	76	94	168	75	106	180	439
0.96	1.04	131	150	185	323	113	170	293	695
0.98	1.02	203	231	284	486	141	223	390	900
0.99	1.01	300	338	414	695	169	280	494	1,110
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.09	1.2	0.00	0.00	0.18	0.32
0.02	50	0.25	0.47	0.50	1.4	0.11	0.18	0.28	0.48
0.05	20	0.55	0.81	0.90	1.7	0.41	0.58	0.70	0.89
0.10	10	0.82	1.1	1.2	2.2	0.75	1.0	1.1	1.6
0.20	5	1.3	1.7	1.8	3.2	1.5	1.9	2.1	3.1
0.50	2	3.4	4.1	6.3	7.7	5.2	6.5	8.0	11
0.80	1.25	9.8	12	18	25	18	23	31	43
0.90	1.11	18	22	30	53	35	47	62	88
0.96	1.04	34	45	60	128	70	101	130	190
0.98	1.02	53	75	170	240	112	170	210	313
0.99	1.01	81	122	300	439	171	274	322	492

05487500 DES MOINES RIVER NEAR RUNNELLS, IOWA

LOCATION.—Lat 41°29'19", long 93°20'17", in SE1/4 NW1/4 sec. 12, T77N, R22W, Polk County, Hydrologic Unit 07100008, on left bank 10 ft downstream from bridge on State Highway 316, 0.2 mi downstream from South River, 0.5 mi upstream from Camp Creek, 2.2 mi southeast of Runnells, 37.2 mi upstream from Red Rock Dam and at mi 179.5.

DRAINAGE AREA.—11,655 mi^2.

PERIOD OF RECORD.—October 1985 to September 1996.

GAGE.—Water stage recorder. Datum of gage is 700.00 ft above sea level (U.S. Army Corps of Engineers bench mark).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 134,000 ft^3/s, July 11, 1993, gage height, 82.88 ft; minimum daily discharge, 390 ft^3/s, January 10, 1990.

REMARKS.—Flow regulated by dam at Saylorville Lake (station 05481630) 34.2 mi upstream. Stage-discharge relation affected at times by backwater from Lake Red Rock (station 05488100).

Selected values from rating table number 4, developed October 1993

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
43.0	1,400	51.0	16,500
44.0	3,050	54.0	24,000
45.0	4,800	57.0	44,000
46.0	6,630	59.0	75,000
48.0	10,500	61.0	125,000

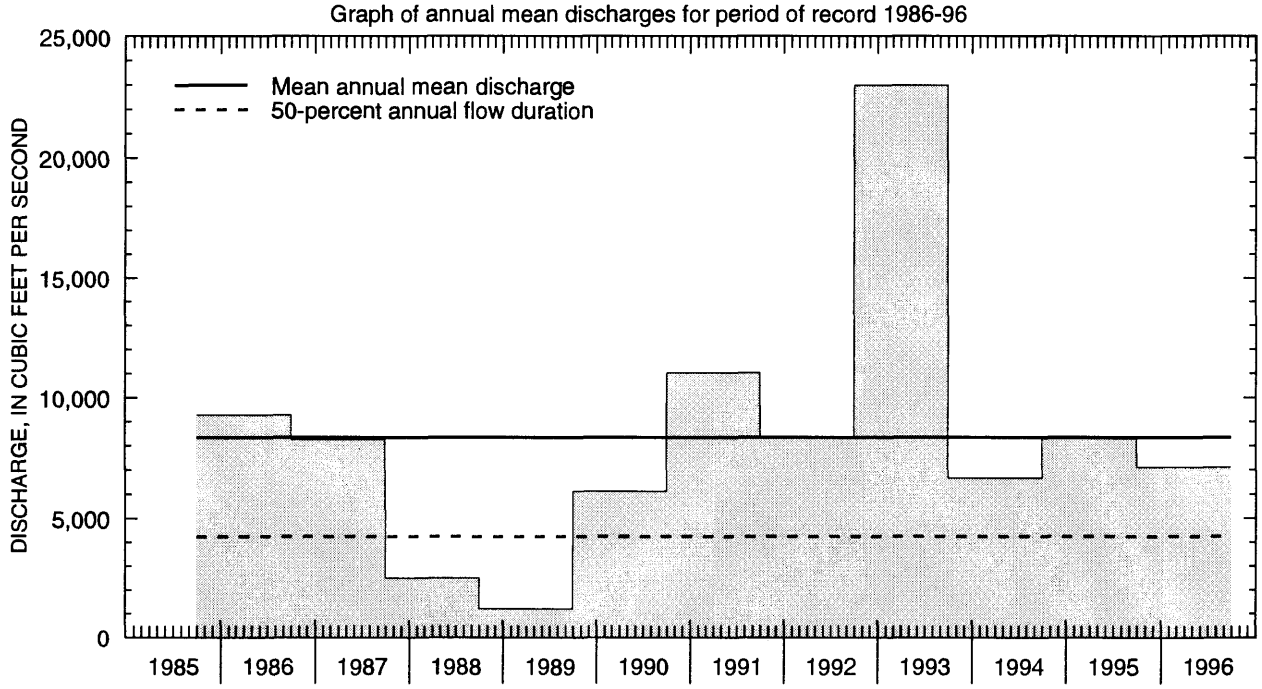
05487500 DES MOINES RIVER NEAR RUNNELLS, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1986-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	18,040	1987	621	1990	4,631	5,212
November	12,660	1993	524	1990	4,263	4,028
December	10,000	1992	473	1990	4,017	3,414
January	6,237	1992	450	1990	2,217	1,714
February	8,190	1992	500	1990	3,107	2,175
March	18,390	1993	1,805	1989	9,517	5,833
April	30,380	1993	1,151	1989	12,380	9,503
May	32,740	1993	2,372	1989	14,540	9,860
June	40,530	1991	1,777	1988	16,140	12,360
July	68,140	1993	840	1988	15,570	18,170
August	32,990	1993	534	1988	8,073	8,802
September	26,320	1993	506	1988	5,298	7,261
Annual	22,980	1993	1,200	1989	8,342	5,629

Graph of annual mean discharges for period of record 1986-96



05487500 DES MOINES RIVER NEAR RUNNELLS, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1986-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	479	445	440	400	431	503	574	1,000	822	561	417	438	440
95	570	488	465	440	490	868	1,060	1,430	1,200	718	522	507	535
90	634	535	532	510	520	2,190	1,800	2,930	2,120	967	597	617	678
85	736	689	636	540	585	2,590	2,300	3,730	2,700	1,610	712	950	987
80	792	750	709	564	900	3,010	3,010	4,590	3,640	3,360	1,860	1,080	1,490
75	883	1,010	1,110	765	1,200	3,250	3,840	5,220	4,610	5,060	2,580	1,400	1,900
70	1,040	1,850	1,800	1,120	1,530	3,640	4,200	5,780	5,740	6,080	3,190	1,600	2,240
60	2,230	2,410	2,200	1,590	1,940	5,170	7,080	7,860	9,390	9,590	4,210	2,010	3,100
50	2,770	2,870	2,900	1,800	2,350	7,410	9,850	9,690	12,800	11,400	5,020	2,400	4,230
40	3,750	3,640	3,990	2,050	2,710	9,720	11,800	16,000	16,000	13,600	5,940	3,030	5,800
30	4,750	4,560	4,930	2,440	3,300	12,100	17,100	21,100	21,000	16,000	8,030	3,680	9,020
25	5,420	4,840	5,610	3,130	3,800	14,000	19,400	24,000	23,500	16,500	9,250	4,560	11,000
20	6,460	6,690	6,700	3,600	4,280	15,900	21,900	25,300	28,200	18,000	10,100	6,060	13,200
15	9,080	9,350	7,530	3,870	4,980	18,000	26,200	27,500	30,900	20,000	12,400	9,070	17,000
10	11,900	11,000	8,580	4,370	6,580	21,000	28,900	29,800	35,400	33,300	23,400	18,000	21,600
5	16,600	12,000	10,800	6,070	10,500	25,600	31,800	34,000	45,900	66,600	31,200	23,500	29,100

Magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges not computed because of backwater effects caused by Lake Red Rock (station 05488100).

05487500 DES MOINES RIVER NEAR RUNNELLS, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1986 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	197	197	197	197	197	203	203	203	219
0.02	50	239	239	240	241	251	267	268	300	314
0.05	20	318	319	326	337	358	395	404	420	523
0.10	10	407	413	425	449	483	549	586	616	800
0.20	5	548	559	581	626	684	798	897	996	1,290
0.50	2	949	976	1,030	1,130	1,270	1,520	1,880	2,250	2,940
0.80	1.25	1,610	1,660	1,750	1,930	2,230	2,670	3,570	4,500	5,890
0.90	1.11	2,100	2,160	2,280	2,510	2,920	3,450	4,810	6,170	8,080
0.96	1.04	2,780	2,850	3,000	3,250	3,830	4,450	6,460	8,340	11,000
0.98	1.02	3,320	3,390	3,560	3,810	4,520	5,170	7,700	9,960	13,100
0.99	1.01	3,890	3,960	4,130	4,370	5,220	5,870	8,940	11,600	15,200

Magnitude and frequency of seasonal low discharges, based on period of record October 1985 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	207	223	227	227	209	236	300	452
0.02	50	254	270	276	276	307	346	430	636
0.05	20	344	360	373	389	536	603	728	1,050
0.10	10	449	466	489	529	864	969	1,150	1,610
0.20	5	617	639	680	763	1,500	1,680	1,950	2,660
0.50	2	1,110	1,190	1,290	1,500	4,040	4,500	5,140	6,660
0.80	1.25	1,970	2,250	2,500	2,830	9,930	11,000	12,700	15,700
0.90	1.11	2,640	3,160	3,550	3,900	15,300	17,000	19,800	23,900
0.96	1.04	3,590	4,570	5,170	5,440	23,800	26,300	31,200	36,900
0.98	1.02	4,360	5,810	6,620	6,700	31,200	34,400	41,500	48,400
0.99	1.01	5,180	7,240	8,280	8,290	39,400	43,400	53,300	61,400
		July-August-September				October-November-December			
0.01	100	379	379	379	388	226	226	226	226
0.02	50	417	417	419	445	272	272	272	272
0.05	20	486	486	503	563	359	376	376	396
0.10	10	566	578	611	715	461	518	535	574
0.20	5	699	748	813	995	624	751	820	885
0.50	2	1,280	1,460	1,650	2,140	1,120	1,450	1,740	1,920
0.80	1.25	3,210	3,690	4,230	5,540	2,000	2,630	3,440	3,910
0.90	1.11	5,960	6,720	7,660	9,870	2,730	3,500	4,760	5,520
0.96	1.04	12,900	13,900	15,700	19,500	3,790	4,660	6,590	7,830
0.98	1.02	22,700	23,500	26,000	31,300	4,690	5,550	8,030	9,710
0.99	1.01	39,000	39,000	42,500	49,200	5,680	6,450	9,530	11,700

05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA

LOCATION.—Lat 41°14'41", long 93°16'08", in NW1/4 NW1/4 sec. 3, T74N, R21W, Marion County, Hydrologic Unit 07100008, on left bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Kirk Branch, and 1.7 mi northwest of Dallas.

DRAINAGE AREA.—342 mi^2.

PERIOD OF RECORD.—October 1962 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 759.21 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 37,300 ft^3/s, July 16, 1982, gage height, 33.45 ft; minimum daily discharge, 0.02 ft^3/s, October 14, 1989.

Selected values from rating table number 13, developed October 1996

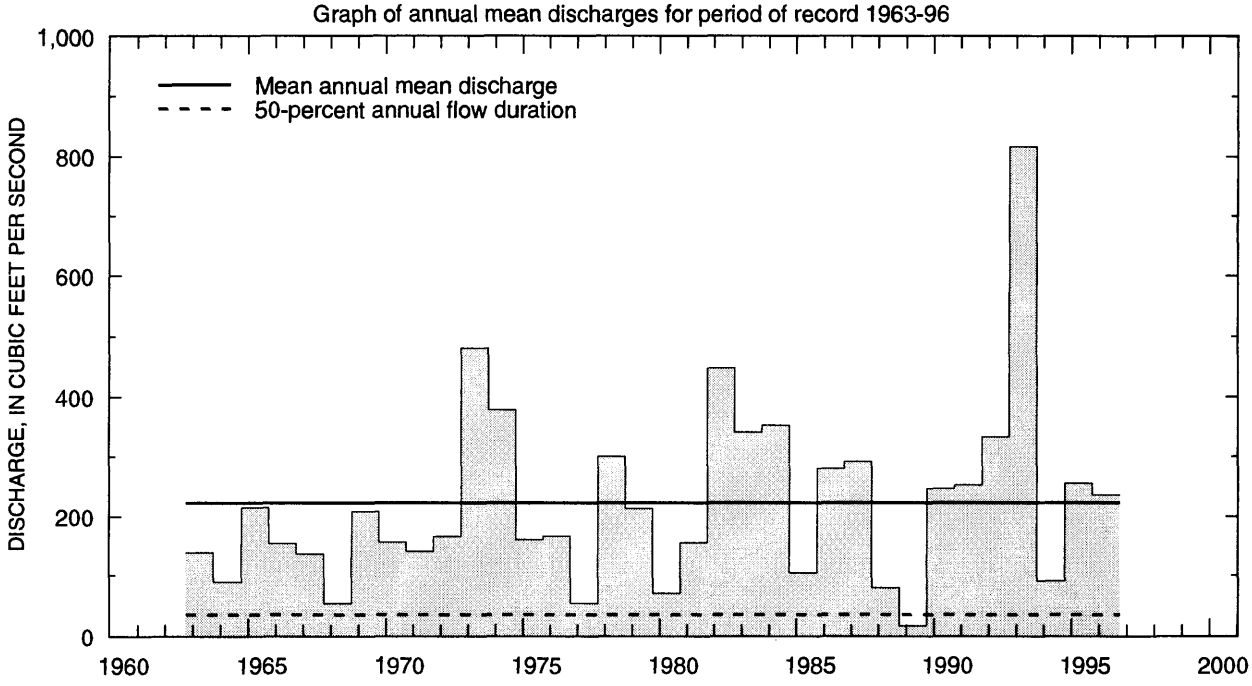
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	10.0	15.0	3,970
6.0	87.4	20.0	7,700
7.0	239	25.0	12,800
8.0	465	30.0	24,900
10.0	1,170	33.5	38,000
12.0	2,190		

05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1963-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,153	1974	1.16	1990	127	256
November	756	1984	1.35	1977	119	173
December	718	1983	0.80	1964	118	178
January	601	1974	0.49	1977	66.4	110
February	718	1973	1.82	1964	165	181
March	1,055	1993	4.05	1964	330	291
April	1,592	1991	3.85	1989	448	424
May	1,823	1996	6.44	1980	388	434
June	1,146	1967	5.13	1977	271	277
July	3,641	1993	1.47	1988	304	705
August	1,202	1993	2.09	1971	129	258
September	1,903	1992	1.11	1968	206	365
Annual	816	1993	17.1	1989	223	155

Graph of annual mean discharges for period of record 1963-96



05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA—Continued

Monthly and annual flow durations, based on period of record 1963-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.17	0.60	0.66	0.43	1.1	1.8	2.8	4.6	2.0	0.78	0.08	0.40	0.56
95	0.70	1.3	1.0	0.90	1.8	6.0	11	8.7	3.9	1.8	1.1	1.0	1.4
90	1.0	1.8	1.6	1.7	2.8	12	24	15	5.4	3.0	1.8	1.4	2.4
85	1.5	2.4	2.5	3.4	5.7	22	32	22	7.4	3.9	2.4	1.7	3.7
80	2.0	3.7	4.1	5.5	9.0	34	38	30	11	5.0	2.9	2.2	5.5
75	3.2	6.8	7.0	7.6	12	52	46	39	16	6.3	3.7	2.6	8.0
70	4.2	9.7	9.3	9.1	15	64	56	46	23	8.5	4.3	3.0	11
60	6.3	15	17	12	30	84	96	68	39	13	6.2	4.4	20
50	12	25	30	18	45	108	136	100	60	20	9.5	7.0	35
40	20	46	45	29	69	142	196	142	92	34	15	16	60
30	31	71	73	46	106	212	290	210	140	79	24	38	100
25	46	89	91	56	140	276	350	291	180	106	32	66	130
20	68	114	115	65	180	378	491	426	262	150	47	108	172
15	101	146	140	86	240	569	700	564	406	230	68	159	251
10	175	238	190	120	346	890	1,160	932	679	404	135	291	442
5	367	511	422	232	698	1,610	2,140	1,980	1,500	1,220	388	993	1,010

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 50 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,960
0.95	1.05	2,790
0.90	1.11	3,390
0.80	1.25	4,320
0.50	2	6,940
0.20	5	11,400
0.10	10	14,800
0.04	25	19,800
0.02	50	23,900
0.01	100	28,500
0.005	200	33,400

[a] Analysis includes area-weighted peak discharges (1946-61) computed from station 05488000 White Breast Creek near Knoxville.

Magnitude and frequency of annual high discharges, based on period of record 1963-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,110	547	281	154
0.95	1.05	1,500	814	482	287
0.90	1.11	1,790	1,010	630	389
0.80	1.25	2,270	1,320	859	549
0.50	2	3,720	2,230	1,480	979
0.20	5	6,560	3,830	2,390	1,590
0.10	10	9,090	5,130	3,010	1,970
0.04	25	13,100	7,030	3,770	2,430
0.02	50	16,900	8,650	4,320	2,740
0.01	100	21,400	10,400	4,850	3,020
0.005	200	26,700	12,400	5,380	3,290

05487980 WHITE BREAST CREEK NEAR DALLAS, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1963 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.02	0.03	0.05	0.08	0.21	0.30	0.35	0.39	0.69
0.02	50	0.03	0.06	0.08	0.12	0.30	0.40	0.53	0.62	1.2
0.05	20	0.08	0.12	0.16	0.24	0.49	0.90	1.0	1.2	2.4
0.10	10	0.17	0.23	0.30	0.41	0.78	1.4	1.7	2.3	4.6
0.20	5	0.40	0.48	0.60	0.80	1.4	2.3	3.5	4.8	9.8
0.50	2	1.6	1.8	2.1	2.7	4.1	7.2	13	19	38
0.80	1.25	5.4	5.7	6.6	8.2	13	26	50	73	134
0.90	1.11	9.3	10	12	14	23	54	101	145	247
0.96	1.04	16	18	21	26	44	124	216	300	462
0.98	1.02	21	25	29	37	67	217	355	478	681
0.99	1.01	28	33	40	52	98	366	556	723	955

Magnitude and frequency of seasonal low discharges, based on period of record October 1962 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.10	0.16	0.24	0.40	0.24	0.64	1.1	1.6
0.02	50	0.18	0.27	0.39	0.68	0.43	0.98	1.6	2.6
0.05	20	0.43	0.59	0.79	1.4	0.94	1.8	2.9	5.4
0.10	10	0.87	1.1	1.5	2.7	1.8	3.1	4.8	9.8
0.20	5	2.0	2.4	3.0	5.7	3.7	5.6	8.6	19
0.50	2	8.2	9.5	11	21	12	16	25	63
0.80	1.25	29	32	36	64	29	41	69	174
0.90	1.11	51	58	65	108	43	63	113	278
0.96	1.04	91	104	118	183	60	97	189	439
0.98	1.02	129	149	172	250	73	127	261	577
0.99	1.01	173	203	238	327	85	159	345	725
		July-August-September				October-November-December			
0.01	100	0.05	0.11	0.16	0.32	0.02	0.06	0.11	0.25
0.02	50	0.08	0.16	0.22	0.43	0.05	0.10	0.18	0.40
0.05	20	0.17	0.28	0.37	0.70	0.13	0.25	0.39	0.80
0.10	10	0.31	0.46	0.60	1.1	0.31	0.51	0.76	1.4
0.20	5	0.64	0.85	1.1	2.0	0.83	1.2	1.7	2.9
0.50	2	2.3	2.7	3.5	6.7	4.3	5.3	7.0	11
0.80	1.25	7.0	8.9	12	26	17	21	27	36
0.90	1.11	12	16	25	58	33	39	52	67
0.96	1.04	20	32	52	140	60	75	102	126
0.98	1.02	27	48	85	254	85	111	157	188
0.99	1.01	36	71	134	443	114	156	228	268

05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IOWA

LOCATION.—Lat 41°19'25", long 93°08'55", in NE1/4 SW1/4 sec. 3, T75N, R20W, Marion County, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on State Highway 92, 1.1 mi upstream from Butcher Creek, 2.2 mi west of Knoxville and 11.1 mi upstream from mouth.

DRAINAGE AREA.—380 mi^2.

PERIOD OF RECORD.—July 1945 to September 1962 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 734.73 ft above sea level (U.S. Army Corps of Engineers bench mark). Prior to February 18, 1949, wire weight gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 14,000 ft^3/s, June 6, 1947, gage height, 19.6 ft, from flood mark; minimum daily discharge, 0.2 ft^3/s, June 27, 1956.

Selected values from rating table number 5, developed March 1962
(A discharge measurement to validate this rating has not been made since October 1962)

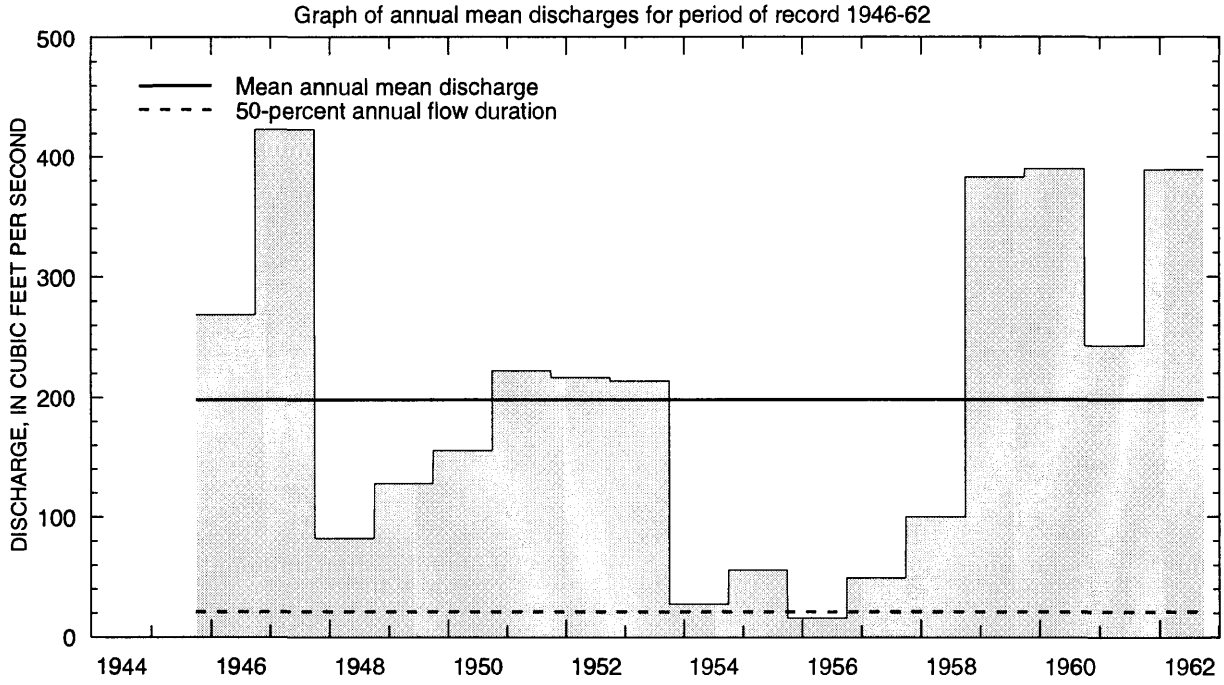
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	377	10.0	3,070
3.0	506	12.0	3,900
4.0	790	14.0	4,850
6.0	1,490	16.0	6,150
8.0	2,270	18.0	8,000

05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-62

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	382	1962	0.82	1957	55.0	96.7
November	966	1962	0.70	1957	111	234
December	213	1960	0.67	1956	35.9	53.9
January	588	1960	0.92	1957	106	192
February	917	1962	2.74	1954	256	234
March	1,202	1961	3.92	1954	459	408
April	1,247	1947	1.67	1956	313	325
May	1,723	1959	13.8	1956	342	451
June	2,693	1947	3.45	1955	461	636
July	783	1958	1.60	1954	115	185
August	328	1959	3.10	1953	72.5	91.8
September	456	1961	1.59	1956	57.3	123
Annual	423	1947	16.0	1956	198	137

Graph of annual mean discharges for period of record 1946-62



05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-62

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.70	0.60	0.50	0.40	0.58	1.4	0.80	1.1	0.60	0.70	0.90	0.50	0.60
95	0.90	0.70	0.70	0.74	1.2	2.0	2.3	2.4	2.1	1.3	1.2	0.70	1.1
90	1.2	1.1	1.1	1.1	1.5	2.6	5.6	7.8	3.3	1.9	1.8	1.1	1.6
85	1.6	1.8	1.5	1.1	2.1	9.9	24	14	4.5	4.4	2.2	1.3	2.0
80	1.8	2.2	1.8	1.6	3.0	21	32	19	6.5	6.9	2.8	1.6	2.6
75	2.0	2.4	2.0	2.0	4.1	28	37	25	9.6	9.5	3.4	1.8	3.3
70	2.2	2.6	2.2	3.4	5.1	36	48	31	16	11	4.2	2.0	4.6
60	2.8	3.1	3.7	5.0	19	75	78	54	30	16	6.6	3.0	10
50	3.8	4.3	8.0	7.0	65	106	119	74	50	21	9.0	3.8	21
40	8.5	14	15	20	107	183	151	100	81	30	13	6.0	38
30	20	43	27	39	183	316	207	156	192	44	20	8.2	75
25	26	52	31	60	242	441	245	195	244	56	28	9.6	101
20	37	64	38	90	346	602	324	264	433	79	38	13	140
15	56	88	54	120	490	834	442	340	624	119	53	21	220
10	83	133	76	170	778	1,290	729	611	1,090	170	113	41	390
5	226	382	113	306	1,230	2,030	1,500	1,600	2,570	451	346	131	970

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 50 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,090
0.95	1.05	2,970
0.90	1.11	3,610
0.80	1.25	4,590
0.50	2	7,360
0.20	5	12,000
0.10	10	15,700
0.04	25	20,900
0.02	50	25,200
0.01	100	30,000
0.005	200	35,100

[a] Analysis includes area-weighted peak discharges (1963-94, 1996) computed from station 0587980 White Breast Creek near Dallas.

Magnitude and frequency of annual high discharges, based on period of record 1946-62

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	423	203	135	71
0.95	1.05	872	440	273	148
0.90	1.11	1,240	639	386	215
0.80	1.25	1,830	969	573	331
0.50	2	3,540	1,930	1,140	706
0.20	5	6,090	3,370	2,060	1,390
0.10	10	7,750	4,290	2,720	1,920
0.04	25	9,720	5,370	3,570	2,650
0.02	50	11,100	6,110	4,200	3,220
0.01	100	12,300	6,770	4,820	3,810
0.005	200	13,500	7,380	5,420	4,410

05488000 WHITEBREAST CREEK NEAR KNOXVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1962

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.15	0.24	0.26	0.27	0.33	0.33	0.33	0.34	0.39
0.02	50	0.19	0.28	0.32	0.34	0.41	0.43	0.44	0.49	0.61
0.05	20	0.27	0.38	0.43	0.47	0.57	0.64	0.71	1.0	1.2
0.10	10	0.38	0.49	0.57	0.64	0.78	0.95	1.1	1.2	2.2
0.20	5	0.57	0.69	0.80	0.93	1.2	1.6	2.0	2.5	4.5
0.50	2	1.3	1.4	1.7	2.0	2.8	4.5	6.5	10	17
0.80	1.25	3.1	3.2	3.6	4.6	7.5	15	24	40	66
0.90	1.11	5.0	5.1	5.7	7.3	13	30	50	81	131
0.96	1.04	8.5	8.6	9.2	12	26	65	114	174	272
0.98	1.02	12	12	13	17	40	109	198	283	435
0.99	1.01	17	17	17	23	61	179	330	439	662

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1962

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.16	0.16	0.16	0.16	0.09	0.26	0.39	0.46
0.02	50	0.24	0.24	0.24	0.25	0.18	0.45	0.66	0.89
0.05	20	0.38	0.40	0.42	0.52	0.48	0.96	1.4	2.3
0.10	10	0.59	0.67	0.75	0.99	1.0	1.8	2.7	4.9
0.20	5	1.0	1.3	1.5	2.2	2.5	3.8	5.5	12
0.50	2	3.4	4.8	6.2	11	10	14	20	51
0.80	1.25	14	21	28	56	33	42	63	171
0.90	1.11	30	47	63	134	54	72	108	293
0.96	1.04	72	116	155	348	84	120	185	485
0.98	1.02	132	215	281	651	109	164	256	650
0.99	1.01	231	381	484	1,150	134	214	338	826
		July-August-September				October-November-December			
0.01	100	0.22	0.26	0.37	0.58	0.19	0.26	0.28	0.28
0.02	50	0.27	0.33	0.45	0.70	0.24	0.32	0.37	0.37
0.05	20	0.39	0.48	0.62	0.96	0.34	0.46	0.53	0.58
0.10	10	0.54	0.67	0.83	1.3	0.49	0.66	0.76	0.89
0.20	5	0.81	1.0	1.2	1.9	0.78	1.1	1.2	1.5
0.50	2	1.8	2.2	2.7	4.5	2.2	3.0	3.5	4.9
0.80	1.25	4.1	5.0	6.4	12	7.8	10	12	18
0.90	1.11	6.4	7.7	11	20	16	22	26	39
0.96	1.04	10	12	18	38	39	50	61	92
0.98	1.02	14	17	26	58	70	90	110	164
0.99	1.01	19	22	37	86	123	156	191	281

05488200 ENGLISH CREEK NEAR KNOXVILLE, IOWA

LOCATION.—Lat 41°16'00", long 93°05'00", in NE1/4 SE1/4 sec. 16, T75N, R19W, Marion County, Hydrologic Unit 07100009, on left bank 30 ft from left upstream abutment of bridge on State Highway 92, 3 mi east of Knoxville, and 11.4 mi upstream from mouth at Des Moines River.

DRAINAGE AREA.—90.1 mi^2.

PERIOD OF RECORD.—July 1985 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 721.79 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 18,900 ft^3/s, July 5, 1993, gage height, 27.88 ft; no flow September 12–17, 1988, August 8–13, 1989, September 6–10, 21, 25–October 3, 1991.

Selected values from rating table number 4, developed October 1992

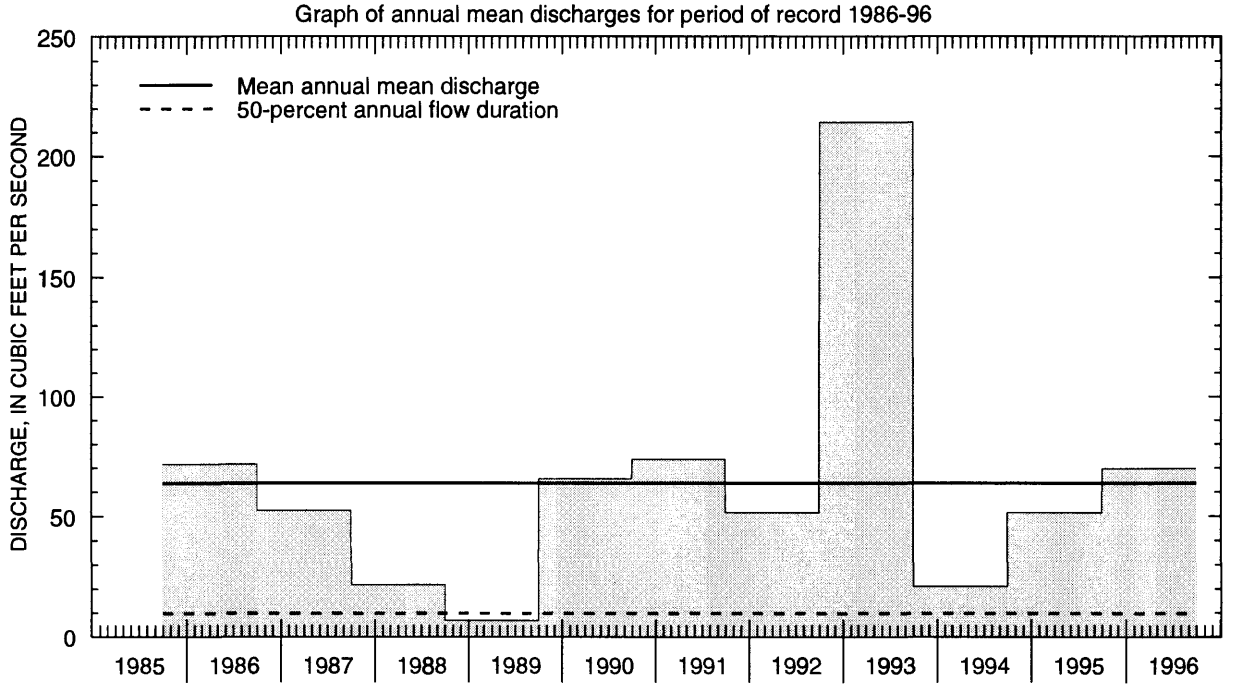
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
8.5	4.50	16.0	827
9.0	18.5	18.0	1,250
10.0	69.3	21.0	2,230
11.0	146	24.0	4,650
12.0	244	27.0	12,500
14.0	501	28.0	20,000

05488200 ENGLISH CREEK NEAR KNOXVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1986-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	161	1987	0.48	1995	26.0	51.3
November	100	1993	0.76	1989	26.1	33.9
December	112	1993	0.31	1989	30.6	41.9
January	43.3	1986	0.66	1989	13.7	14.6
February	65.3	1996	0.50	1989	30.7	21.0
March	335	1993	2.05	1989	85.9	93.5
April	476	1991	1.03	1989	116	145
May	514	1996	2.27	1989	153	165
June	245	1990	2.27	1992	68.9	80.0
July	1,039	1993	0.18	1988	117	308
August	285	1993	0.17	1988	41.9	85.9
September	159	1992	0.026	1991	49.6	63.5
Annual	214	1993	6.71	1989	63.5	54.9

Graph of annual mean discharges for period of record 1986-96



05488200 ENGLISH CREEK NEAR KNOXVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1986-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.02	0.12	0.18	0.13	0.37	0.64	0.39	0.21	0.45	0.04	0.00	0.00	0.02
95	0.06	0.28	0.27	0.34	0.52	1.5	0.87	0.68	0.63	0.07	0.02	0.00	0.12
90	0.15	0.49	0.48	0.42	1.7	4.9	5.3	2.8	0.79	0.11	0.04	0.03	0.34
85	0.21	0.60	0.57	0.78	2.3	11	7.4	4.8	1.1	0.27	0.08	0.07	0.52
80	0.27	0.80	0.78	1.2	3.0	13	8.3	7.1	1.4	0.39	0.12	0.11	0.80
75	0.35	0.95	0.92	1.6	5.6	16	9.5	8.6	2.3	0.58	0.22	0.20	1.3
70	0.43	1.2	1.5	2.4	7.6	19	11	11	3.8	0.88	0.41	0.34	1.9
60	0.70	1.9	3.3	3.5	11	25	14	19	7.6	1.9	1.0	0.54	4.4
50	1.6	3.4	10	6.0	15	29	24	29	13	4.0	1.7	1.3	9.7
40	3.0	8.6	15	12	17	33	31	43	21	7.4	2.6	3.1	16
30	7.1	18	23	14	26	46	50	70	33	16	4.8	8.1	26
25	18	23	30	16	35	56	65	87	45	26	6.3	16	33
20	23	28	33	19	43	73	86	125	59	41	11	26	42
15	35	38	39	24	50	102	135	185	77	75	19	40	59
10	50	52	54	34	70	171	255	372	128	175	53	66	95
5	109	98	86	43	110	342	625	1,020	250	586	113	217	238

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 11 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	421
0.95	1.05	731
0.90	1.11	976
0.80	1.25	1,380
0.50	2	2,640
0.20	5	4,960
0.10	10	6,850
0.04	25	9,630
0.02	50	12,000
0.01	100	14,500
0.005	200	17,300

Magnitude and frequency of annual high discharges, based on period of record 1986-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	300	165	72	37
0.95	1.05	440	240	114	66
0.90	1.11	545	296	147	90
0.80	1.25	711	386	202	130
0.50	2	1,210	671	380	265
0.20	5	2,140	1,230	744	536
0.10	10	2,920	1,720	1,080	773
0.04	25	4,110	2,510	1,610	1,140
0.02	50	5,160	3,240	2,110	1,470
0.01	100	6,360	4,090	2,690	1,840
0.005	200	7,720	5,100	3,380	2,270

05488200 ENGLISH CREEK NEAR KNOXVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1986 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.10	0.13
0.02	50	0.00	0.00	0.00	0.00	0.01	0.02	0.06	0.14	0.22
0.05	20	0.00	0.00	0.00	0.00	0.02	0.04	0.12	0.24	0.47
0.10	10	0.00	0.00	0.00	0.00	0.04	0.09	0.21	0.39	0.89
0.20	5	0.00	0.00	0.00	0.00	0.10	0.22	0.44	0.73	1.9
0.50	2	0.05	0.07	0.12	0.17	0.49	1.1	1.8	2.5	7.7
0.80	1.25	0.29	0.34	0.47	0.75	2.0	5.3	7.7	9.5	28
0.90	1.11	0.76	0.81	0.97	1.4	3.9	12	16	19	54
0.96	1.04	2.0	2.1	2.2	3.0	7.4	27	37	43	105
0.98	1.02	4.1	4.2	4.3	5.0	11	45	63	72	159
0.99	1.01	8.2	8.3	8.4	9.0	15	71	102	115	230

Magnitude and frequency of seasonal low discharges, based on period of record July 1985 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.01	0.04	0.08	0.18	0.04	0.06	0.10	0.31
0.02	50	0.02	0.07	0.13	0.28	0.06	0.10	0.15	0.50
0.05	20	0.07	0.16	0.26	0.55	0.12	0.21	0.30	1.0
0.10	10	0.17	0.32	0.47	0.95	0.23	0.40	0.55	1.9
0.20	5	0.46	0.70	0.96	1.8	0.48	0.82	1.1	3.8
0.50	2	2.3	2.8	3.4	5.8	1.8	2.9	4.2	14
0.80	1.25	8.7	9.4	11	16	5.7	8.6	15	45
0.90	1.11	16	17	18	27	10	14	28	80
0.96	1.04	27	30	32	45	18	24	55	145
0.98	1.02	36	43	45	61	25	32	85	210
0.99	1.01	47	59	60	80	34	42	123	290
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.08
0.02	50	0.00	0.00	0.00	0.01	0.00	0.02	0.02	0.11
0.05	20	0.00	0.00	0.00	0.02	0.00	0.04	0.04	0.17
0.10	10	0.00	0.00	0.01	0.05	0.01	0.07	0.08	0.27
0.20	5	0.00	0.00	0.03	0.13	0.07	0.15	0.18	0.48
0.50	2	0.09	0.15	0.19	0.79	0.47	0.73	0.92	1.7
0.80	1.25	0.72	1.0	1.6	5.0	3.1	4.1	5.2	7.0
0.90	1.11	2.9	4.1	5.6	13	8.7	11	14	16
0.96	1.04	14	21	27	38	27	32	39	41
0.98	1.02	45	55	69	74	59	66	79	80
0.99	1.01	150	153	157	160	124	129	150	155

05488500 DES MOINES RIVER NEAR TRACY, IOWA

LOCATION.—Lat 41°16'53", long 92°51'34", in NW1/4 SE1/4 sec. 19, T75N, R17W, Mahaska County, Hydrologic Unit 07100009, on right bank 250 ft upstream from abandoned Bellefountaine Bridge, 0.8 mi east of Tracy, 3.1 mi upstream from Cedar Creek, 3.8 mi downstream from bridge on newly located State Highway 92, 6.4 mi downstream from English Creek, and at mile 130.4.

DRAINAGE AREA.—12,479 mi^2.

PERIOD OF RECORD.—March 1920 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 670.91 ft above sea level. Prior to June 26, 1940 and June 30, 1952, to November 4, 1960, nonrecording gage, and June 27, 1940, to June 29, 1952, water-stage recorder at site 250 ft downstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 155,000 ft^3/s, June 14, 1947, gage height, 26.5 ft; minimum daily discharge, 40 ft^3/s, January 29–February 1, 1940.

REMARKS.—Flow regulated since March 12, 1969, by dam at Lake Red Rock (station 05488100) 11.9 mi upstream.

Selected values from rating table number 14, developed October 1993

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	620	12.0	24,100
3.0	1,550	15.0	35,000
4.0	3,490	18.0	47,700
6.0	7,720	21.0	64,000
9.0	15,200	24.0	105,000

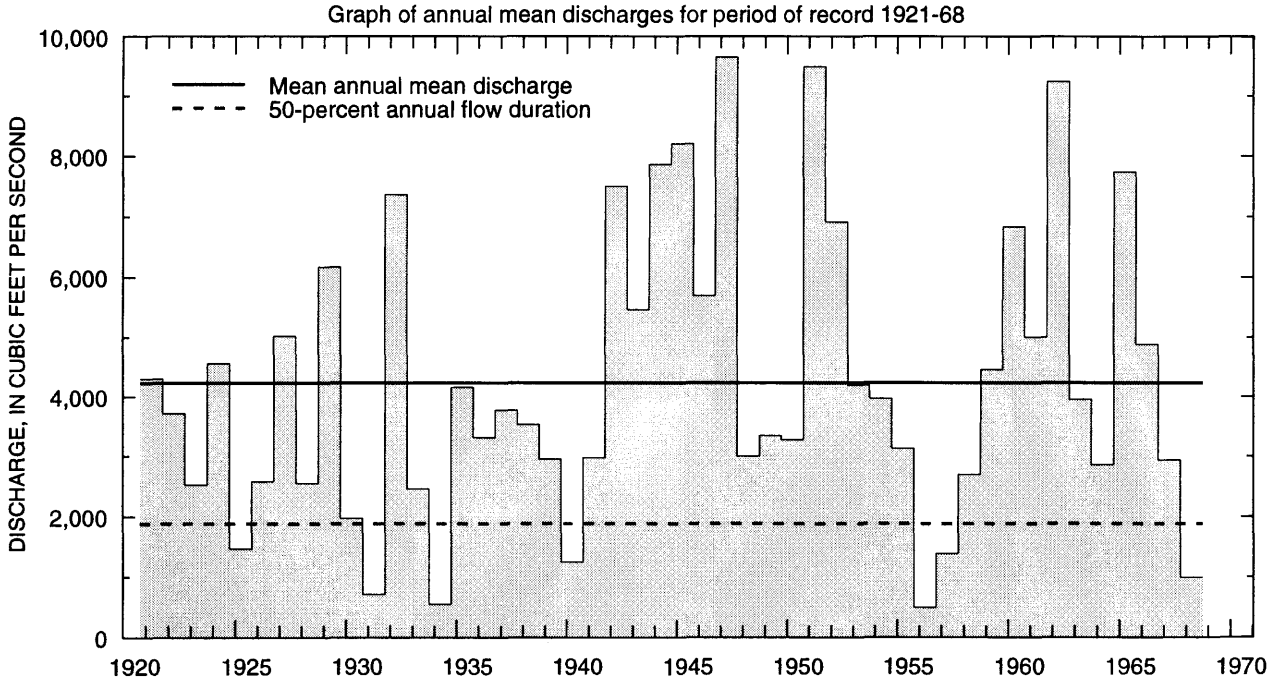
05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1921-68

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	9,065	1966	176	1957	2,084	2,209
November	11,700	1942	177	1956	2,098	2,635
December	7,242	1932	133	1956	1,350	1,506
January	13,810	1932	72.1	1940	1,532	2,344
February	6,952	1962	78.4	1940	2,787	1,990
March	20,130	1929	425	1931	7,142	5,526
April	37,890	1965	699	1956	8,255	8,373
May	30,140	1944	356	1934	6,638	5,933
June	51,550	1947	808	1956	9,032	8,619
July	15,770	1951	415	1936	4,529	3,753
August	9,940	1943	191	1936	2,590	2,137
September	12,830	1926	350	1955	2,773	3,040
Annual	9,660	1947	496	1956	4,231	2,417

Graph of annual mean discharges for period of record 1921-68



05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1921-68

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	139	168	124	74	84	310	442	313	362	262	164	195	140
95	230	230	170	140	169	393	785	520	710	459	308	265	245
90	324	324	219	180	304	605	1,130	770	1,190	761	527	395	370
85	362	388	261	220	368	823	1,540	1,170	1,420	1,020	669	460	480
80	402	442	313	245	455	1,400	1,880	1,640	1,880	1,200	750	538	605
75	459	505	379	310	540	1,760	2,370	2,070	2,380	1,460	866	592	720
70	524	581	424	400	640	2,230	2,940	2,510	2,830	1,710	980	675	881
60	710	755	581	610	965	3,320	3,710	3,440	4,120	2,270	1,190	898	1,300
50	950	1,040	795	750	1,400	4,390	4,640	4,580	5,320	2,880	1,480	1,160	1,880
40	1,470	1,440	1,050	940	2,300	5,760	5,850	5,920	6,970	3,710	1,840	1,640	2,780
30	2,170	1,940	1,320	1,230	3,320	7,820	8,380	7,430	9,380	4,830	2,500	2,440	4,060
25	2,630	2,250	1,460	1,430	4,100	9,300	10,200	8,340	10,900	5,640	3,010	2,980	4,960
20	3,360	2,840	1,770	1,800	5,000	11,500	12,200	9,170	12,800	6,590	3,900	3,790	6,050
15	4,010	3,420	2,350	2,200	6,000	13,800	15,200	11,000	16,200	7,840	4,900	5,010	7,650
10	5,390	4,290	3,100	2,700	7,380	18,300	19,400	13,600	21,500	9,960	6,210	6,480	10,300
5	6,930	7,180	4,760	5,000	9,210	24,000	28,100	21,000	32,000	12,900	8,600	10,600	15,800

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 59 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	13,600
0.90	1.11	16,500
0.80	1.25	20,900
0.50	2	32,500
0.20	5	50,000
0.10	10	62,400
0.04	25	78,700
0.02	50	91,300
0.01	100	104,000
0.005	200	118,000

Magnitude and frequency of annual high discharges, based on period of record 1921-68

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	3,440	2,320	1,820	1,230
0.95	1.05	7,440	5,540	4,100	2,900
0.90	1.11	10,700	8,280	6,030	4,350
0.80	1.25	15,800	12,800	9,210	6,760
0.50	2	29,600	24,900	18,200	13,700
0.20	5	47,500	40,100	30,900	23,400
0.10	10	57,500	48,200	38,500	29,100
0.04	25	67,900	56,100	46,900	35,300
0.02	50	74,200	60,600	52,300	39,100
0.01	100	79,500	64,200	56,900	42,400
0.005	200	83,900	67,000	60,900	45,200

05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1920 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	46	46	48	51	62	78	102	111	133
0.02	50	60	60	63	67	81	101	131	144	176
0.05	20	87	88	92	98	118	148	189	211	266
0.10	10	119	121	127	136	163	205	261	294	379
0.20	5	170	175	183	199	238	299	380	435	574
0.50	2	317	332	350	386	464	588	756	886	1,220
0.80	1.25	551	581	621	699	850	1,100	1,450	1,730	2,460
0.90	1.11	715	757	815	928	1,140	1,480	2,000	2,420	3,470
0.96	1.04	924	980	1,070	1,230	1,530	2,020	2,790	3,410	4,940
0.98	1.02	1,080	1,150	1,260	1,460	1,830	2,440	3,440	4,220	6,160
0.99	1.01	1,230	1,310	1,440	1,690	2,130	2,880	4,130	5,100	7,470

Magnitude and frequency of seasonal low discharges, based on period of record March 1920 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	48	48	51	66	141	174	193	240
0.02	50	64	64	68	88	195	241	268	335
0.05	20	96	99	106	134	313	385	430	541
0.10	10	136	145	155	194	468	572	642	815
0.20	5	204	225	243	304	745	903	1,020	1,310
0.50	2	440	504	556	702	1,690	2,010	2,300	3,030
0.80	1.25	932	1,070	1,210	1,590	3,540	4,100	4,740	6,470
0.90	1.11	1,370	1,550	1,790	2,420	5,030	5,750	6,680	9,300
0.96	1.04	2,050	2,270	2,680	3,770	7,160	8,040	9,400	13,400
0.98	1.02	2,660	2,880	3,460	5,000	8,870	9,850	11,600	16,700
0.99	1.01	3,340	3,550	4,320	6,440	10,700	11,700	13,800	20,300
		July-August-September				October-November-December			
0.01	100	102	110	122	158	66	76	85	102
0.02	50	126	136	150	194	81	93	103	125
0.05	20	172	185	206	265	112	126	141	171
0.10	10	227	245	273	351	149	167	186	228
0.20	5	318	345	385	498	211	236	264	326
0.50	2	609	668	753	988	411	470	531	665
0.80	1.25	1,170	1,310	1,500	2,010	806	966	1,110	1,420
0.90	1.11	1,650	1,870	2,150	2,940	1,150	1,430	1,670	2,150
0.96	1.04	2,380	2,740	3,190	4,440	1,680	2,190	2,600	3,380
0.98	1.02	3,020	3,520	4,120	5,820	2,140	2,890	3,480	4,570
0.99	1.01	3,740	4,410	5,200	7,440	2,670	3,740	4,560	6,030

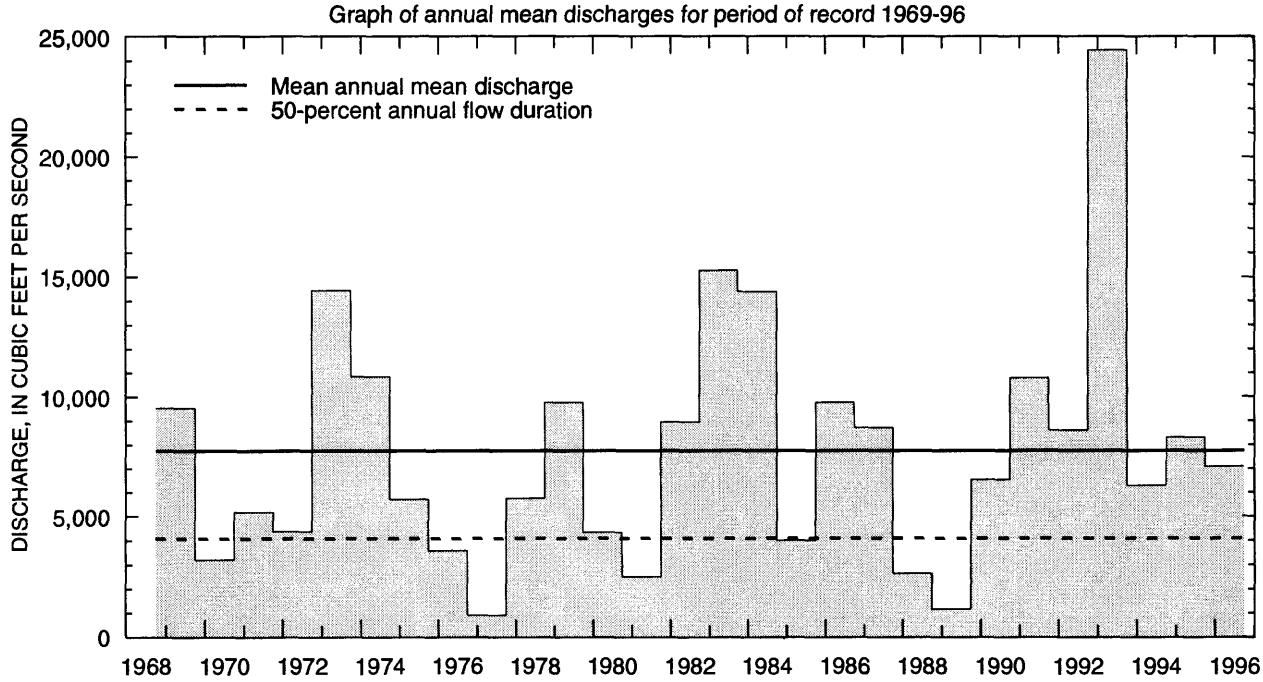
05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1969-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	17,190	1974	318	1977	4,017	4,131
November	19,160	1987	340	1977	4,879	4,816
December	12,540	1983	344	1977	3,911	3,558
January	11,510	1973	305	1977	2,644	2,873
February	15,560	1973	276	1977	4,297	4,381
March	21,520	1983	746	1977	9,251	5,624
April	23,890	1979	866	1977	11,670	7,410
May	28,280	1993	425	1977	11,640	6,849
June	30,250	1984	277	1977	13,200	8,671
July	80,800	1993	220	1977	13,780	15,350
August	45,240	1993	591	1989	8,617	9,467
September	33,670	1993	342	1976	4,810	6,456
Annual	24,450	1993	898	1977	7,744	5,074

Graph of annual mean discharges for period of record 1969-96



05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1969-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	308	329	297	290	242	237	521	350	220	212	218	339	273
95	347	344	360	380	394	636	943	1,140	1,200	394	374	361	386
90	393	633	518	453	472	1,190	1,880	2,390	2,500	1,160	439	411	599
85	513	841	787	550	620	1,900	2,810	3,290	3,300	1,390	696	517	840
80	564	1,060	1,000	620	760	2,630	3,770	4,280	3,820	1,960	961	759	1,130
75	720	1,300	1,270	740	840	3,330	4,530	4,860	4,600	2,720	1,220	845	1,420
70	995	1,610	1,500	876	937	3,900	5,060	5,640	5,430	3,630	1,590	1,010	1,870
60	1,660	2,190	1,900	1,140	1,300	5,220	6,880	7,820	9,050	7,330	3,020	1,460	2,790
50	2,350	2,780	2,320	1,420	1,880	6,690	9,530	10,900	14,300	11,900	4,570	2,150	4,080
40	3,130	3,580	3,100	2,040	2,450	8,620	12,500	15,500	17,200	16,200	7,280	2,790	6,110
30	4,060	5,130	4,360	2,700	3,900	11,900	16,700	17,500	18,000	18,200	13,000	3,550	9,600
25	5,320	6,820	5,000	3,120	4,560	13,900	18,200	17,900	18,600	18,700	16,400	5,090	12,300
20	6,310	8,320	6,050	3,820	5,740	16,800	20,000	18,200	20,500	19,300	17,200	7,670	15,800
15	7,920	10,100	7,720	4,500	8,200	19,300	23,800	18,600	21,700	21,300	17,700	9,760	17,600
10	10,400	14,000	9,500	6,540	12,700	22,200	24,900	20,000	22,500	22,200	18,500	13,700	18,800
5	16,500	16,800	13,900	9,980	21,200	25,100	27,100	23,100	30,100	30,900	21,300	17,600	22,900

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05488500 DES MOINES RIVER NEAR TRACY, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1969 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	134	134	135	137	137	140	150	161	225
0.02	50	151	152	156	168	168	179	201	222	308
0.05	20	183	187	199	224	231	261	310	354	485
0.10	10	221	229	249	285	310	366	454	529	717
0.20	5	282	298	334	389	449	555	716	849	1,130
0.50	2	482	529	621	734	952	1,250	1,680	2,010	2,570
0.80	1.25	898	1,030	1,250	1,470	2,140	2,910	3,860	4,490	5,460
0.90	1.11	1,290	1,530	1,860	2,170	3,350	4,570	5,900	6,680	7,900
0.96	1.04	1,960	2,380	2,910	3,340	5,500	7,450	9,210	10,100	11,500
0.98	1.02	2,600	3,230	3,950	4,470	7,640	10,300	12,200	13,000	14,500
0.99	1.01	3,400	4,300	5,240	5,840	10,400	13,700	15,800	16,200	17,700

Magnitude and frequency of seasonal low discharges, based on period of record
October 1968 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	166	190	191	191	155	186	218	254
0.02	50	195	223	227	227	243	294	348	421
0.05	20	251	290	300	307	456	559	668	844
0.10	10	319	372	389	414	766	949	1,140	1,480
0.20	5	435	513	546	605	1,360	1,710	2,060	2,720
0.50	2	838	1,020	1,120	1,320	3,550	4,500	5,380	7,090
0.80	1.25	1,760	2,210	2,520	3,090	7,670	9,820	11,500	14,400
0.90	1.11	2,690	3,440	4,010	4,980	10,700	13,800	15,900	19,200
0.96	1.04	4,340	5,680	6,770	8,460	14,600	18,800	21,300	24,400
0.98	1.02	6,000	7,990	9,670	12,100	17,400	22,400	25,100	27,800
0.99	1.01	8,130	11,000	13,500	16,800	20,100	25,900	28,600	30,600
		July-August-September				October-November-December			
0.01	100	206	206	206	206	124	124	157	157
0.02	50	229	229	229	229	153	160	202	208
0.05	20	270	270	278	298	209	233	295	322
0.10	10	292	315	342	421	278	325	413	473
0.20	5	340	402	461	653	393	486	620	746
0.50	2	580	786	969	1,630	776	1,040	1,350	1,740
0.80	1.25	1,500	2,100	2,610	4,460	1,570	2,230	2,940	3,930
0.90	1.11	2,990	4,050	4,870	7,850	2,280	3,310	4,420	5,940
0.96	1.04	7,320	9,100	10,300	14,800	3,420	5,030	6,820	9,130
0.98	1.02	14,300	16,400	17,600	22,600	4,460	6,590	9,020	12,000
0.99	1.01	27,800	29,000	29,400	33,600	5,680	8,390	11,600	15,300

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05489000 CEDAR CREEK NEAR BUSSEY, IOWA

LOCATION.—Lat 41°13'09", long 92°54'38", at SW corner sec. 11, T74N, R18W, Marion County, Hydrologic Unit 07100009, on left bank 10 ft downstream from bridge on State Highway 156, 0.8 mi downstream from North Cedar Creek, 1.6 mi northwest of Bussey, 3.0 mi upstream from Honey Creek, and 8.9 mi upstream from mouth.

DRAINAGE AREA.—374 mi^2.

PERIOD OF RECORD.—October 1947 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 682.15 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to February 21, 1949, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 96,000 ft^3/s, July 3, 1982, gage height, 34.61 ft; no flow September 6–20, 1955, October 11–12, 1956, August 12–13, 1989.

Selected values from rating table number 12, developed October 1992

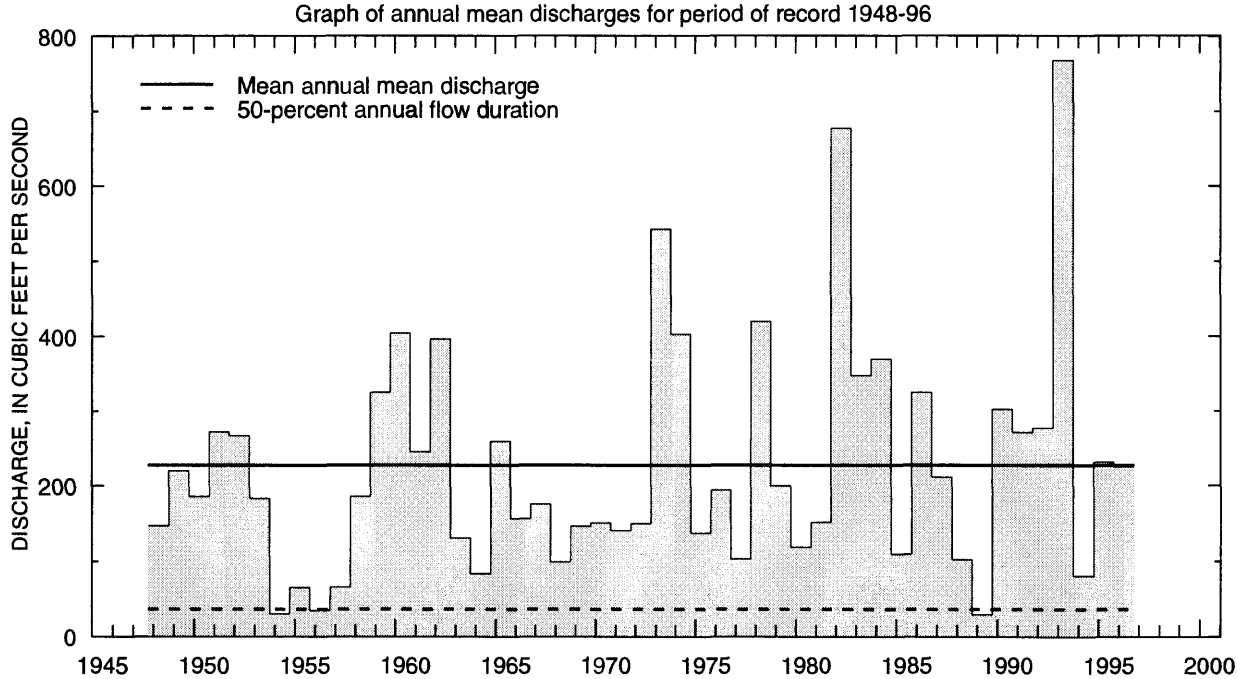
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	9.2	15.5	3,800
5.5	106	20.5	7,300
6.5	301	25.5	14,500
8.5	815	30.5	44,500
10.5	1,470	34.6	96,000
12.5	2,280		

05489000 CEDAR CREEK NEAR BUSSEY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1948-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	950	1974	0.18	1957	97.9	197
November	1,331	1962	0.33	1956	131	239
December	844	1983	0.39	1956	93.9	152
January	894	1974	0.20	1956	87.5	153
February	952	1949	2.29	1954	227	233
March	1,371	1960	3.78	1954	407	359
April	1,553	1973	0.79	1956	407	385
May	1,797	1996	7.19	1956	419	453
June	1,258	1967	2.74	1977	289	314
July	3,846	1982	2.26	1988	294	737
August	1,070	1993	2.51	1953	109	197
September	1,384	1992	0.60	1953	162	301
Annual	768	1993	29.4	1989	227	154

Graph of annual mean discharges for period of record 1948-96



05489000 CEDAR CREEK NEAR BUSSEY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1948-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.30	0.30	0.11	0.10	1.5	0.60	0.22	0.40	0.25	0.11	0.00	0.20
95	0.50	0.70	1.1	0.47	1.3	5.3	8.3	8.6	3.7	1.7	1.5	0.70	1.1
90	0.80	1.9	1.7	1.4	3.1	14	31	18	6.8	3.8	2.6	1.5	2.4
85	1.4	3.0	2.4	2.7	5.2	29	41	27	8.8	5.7	3.4	2.1	3.7
80	1.9	3.5	3.2	4.1	9.0	41	50	34	12	7.4	4.2	2.8	5.4
75	2.3	4.3	4.4	6.8	13	53	58	42	17	9.6	5.2	3.5	7.8
70	2.8	5.4	6.2	9.0	19	67	73	52	23	12	6.5	4.2	11
60	4.0	9.9	14	14	30	95	104	74	39	18	9.0	5.6	21
50	7.4	23	23	19	49	125	137	103	61	25	13	7.9	36
40	19	37	35	32	90	164	186	140	91	38	19	12	61
30	33	55	54	49	130	250	259	198	140	68	31	26	100
25	48	74	67	65	160	334	311	245	177	91	39	38	129
20	66	98	89	78	220	462	411	341	250	129	54	61	168
15	88	131	117	100	312	665	583	500	351	199	82	96	240
10	141	190	155	150	500	960	908	833	611	315	129	170	400
5	277	433	324	280	1,050	1,840	1,850	2,060	1,410	977	342	585	971

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 54 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,100
0.95	1.05	3,000
0.90	1.11	3,680
0.80	1.25	4,770
0.50	2	8,190
0.20	5	14,900
0.10	10	20,800
0.04	25	30,200
0.02	50	38,800
0.01	100	49,000
0.005	200	61,000

Magnitude and frequency of annual high discharges, based on period of record 1948-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	918	479	312	176
0.95	1.05	1,380	755	485	301
0.90	1.11	1,720	960	613	395
0.80	1.25	2,270	1,280	811	541
0.50	2	3,890	2,210	1,380	947
0.20	5	6,800	3,780	2,320	1,570
0.10	10	9,170	4,990	3,040	2,010
0.04	25	12,700	6,690	4,050	2,570
0.02	50	15,700	8,080	4,860	2,980
0.01	100	19,100	9,560	5,720	3,400
0.005	200	22,900	11,100	6,640	3,810

05489000 CEDAR CREEK NEAR BUSSEY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1948 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.08	0.20	0.24	0.25	0.49
0.02	50	0.00	0.00	0.00	0.00	0.13	0.31	0.41	0.42	0.90
0.05	20	0.00	0.05	0.09	0.13	0.28	0.63	0.88	1.0	2.1
0.10	10	0.16	0.16	0.23	0.31	0.53	1.1	1.7	2.1	4.3
0.20	5	0.46	0.46	0.57	0.73	1.1	2.3	3.6	4.7	9.7
0.50	2	1.9	2.2	2.3	2.8	4.1	8.2	14	19	38
0.80	1.25	5.7	6.9	7.3	8.7	13	27	45	65	120
0.90	1.11	10	11	12	15	23	48	79	113	203
0.96	1.04	16	16	20	24	40	88	140	195	334
0.98	1.02	20	20	27	33	57	127	198	269	447
0.99	1.01	24	24	34	43	76	176	267	353	570

Magnitude and frequency of seasonal low discharges, based on period of record October 1947 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.05	0.05	0.08	0.11	0.20	0.35	0.39	0.76
0.02	50	0.10	0.11	0.17	0.24	0.39	0.66	0.75	1.5
0.05	20	0.29	0.34	0.46	0.74	1.0	1.6	1.9	4.1
0.10	10	0.68	0.82	1.1	1.8	2.1	3.2	3.9	8.9
0.20	5	1.8	2.2	2.7	4.8	4.8	6.8	8.9	21
0.50	2	8.8	11	12	23	17	23	33	78
0.80	1.25	32	37	42	79	42	58	91	207
0.90	1.11	56	63	73	130	60	85	138	305
0.96	1.04	94	101	119	202	81	118	201	424
0.98	1.02	127	132	158	258	94	140	246	503
0.99	1.01	162	163	199	311	105	161	288	574
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.37	0.00	0.08	0.09	0.10
0.02	50	0.00	0.00	0.00	0.54	0.00	0.13	0.15	0.19
0.05	20	0.09	0.16	0.24	0.93	0.19	0.28	0.33	0.44
0.10	10	0.33	0.38	0.55	1.5	0.39	0.53	0.65	0.90
0.20	5	0.77	0.92	1.2	2.7	0.85	1.1	1.4	2.1
0.50	2	2.8	3.6	4.5	8.0	3.5	4.7	6.1	9.2
0.80	1.25	8.3	11	13	23	14	18	24	35
0.90	1.11	14	17	21	41	28	37	47	66
0.96	1.04	24	27	35	73	62	75	94	125
0.98	1.02	32	36	46	106	102	118	145	185
0.99	1.01	43	45	59	148	162	176	213	259

05489500 DES MOINES RIVER AT OTTUMWA, IOWA

LOCATION.—Lat 41°00'39", long 92°24'40", in SE1/4 NE1/4 sec. 25 T72N, R14W, Wapello County, Hydrologic Unit 07100009, on right bank 15 ft downstream from Colorado and Eastern Railroad Bridge in Ottumwa, 0.4 mi downstream from Ottumwa powerplant, 6.5 mi upstream from Village Creek, 9.5 mi downstream from South Avery Creek, and at mile 94.1.

DRAINAGE AREA.—13,374 mi^2.

PERIOD OF RECORD.—March 1917 to September 1996 (published as "at Eldon" October 1930 to March 1935). Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 622.00 ft above sea level. Prior to September 30, 1930, nonrecording gage at Market Street Bridge 1,700 ft upstream at datum 0.83 ft higher. October 1, 1930 to March 31, 1935, nonrecording gage at Eldon 15 mi downstream at different datum. April 1, 1935 to October 25, 1963, water-stage recorder at site 1,100 ft downstream at Vine Street Bridge at datum 0.77 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 135,000 ft^3/s, June 7, 1947, gage height, 20.2 ft; maximum gage height, 22.15 ft, July 12, 1993; minimum daily discharge, 26 ft^3/s, October 25, 1990.

REMARKS.—Flow regulated since March 12, 1969, by dam at Lake Red Rock (station 05488100) 48.2 mi upstream.

Selected values from rating table number 12, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	520	8.0	20,700
2.0	2,200	10.0	28,100
3.0	4,490	12.0	36,000
4.0	7,190	15.0	49,400
6.0	13,600	20.0	84,500
7.0	17,200	22.5	115,000

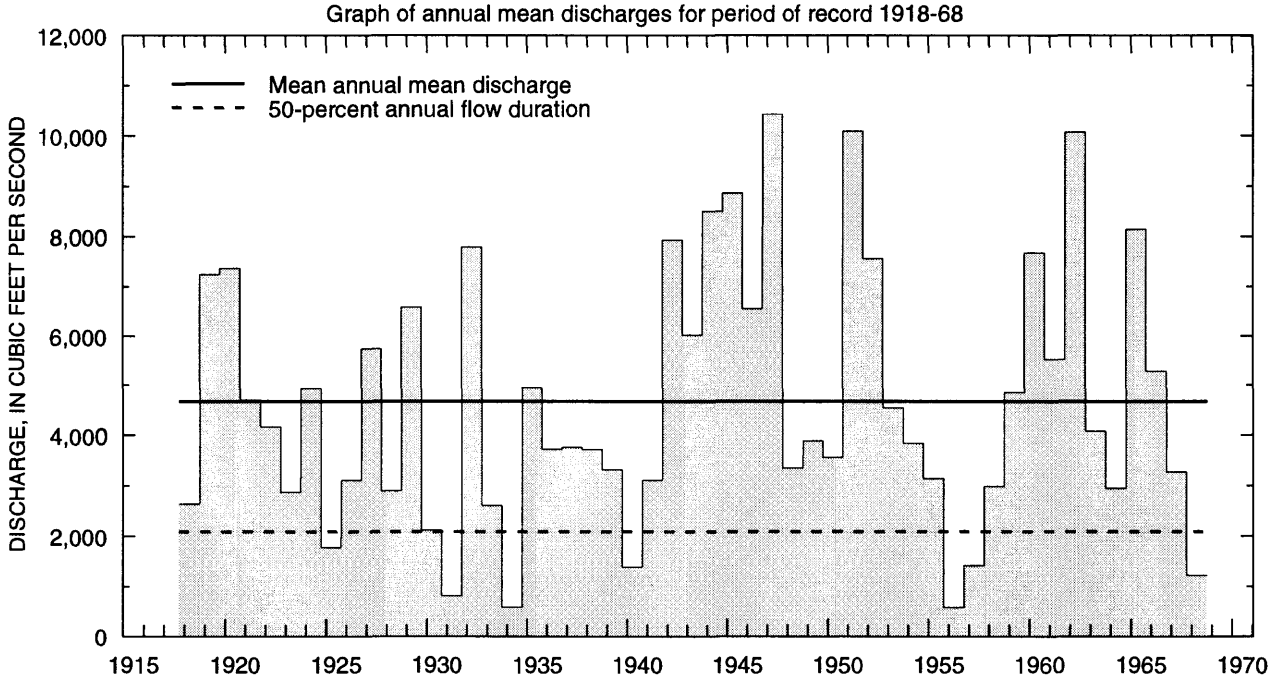
05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1918-68

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	9,285	1966	209	1957	2,211	2,287
November	12,570	1942	223	1956	2,331	2,825
December	7,686	1932	142	1956	1,478	1,575
January	14,610	1932	87.8	1940	1,659	2,505
February	8,218	1962	102	1940	2,991	2,066
March	22,840	1929	449	1931	7,985	6,052
April	38,020	1965	716	1956	9,075	8,592
May	30,880	1944	413	1931	7,419	6,363
June	54,020	1947	830	1956	10,000	9,039
July	16,960	1951	462	1956	5,092	4,191
August	10,670	1943	167	1934	2,839	2,212
September	14,330	1926	348	1955	2,986	3,175
Annual	10,430	1947	572	1956	4,669	2,587

Graph of annual mean discharges for period of record 1918-68



05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1918-68

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	125	150	97	60	71	310	495	352	411	272	119	171	109
95	228	243	150	110	200	444	1,030	626	889	500	322	272	250
90	324	328	210	180	305	666	1,420	931	1,330	801	550	412	393
85	394	410	255	220	401	1,140	1,740	1,340	1,670	1,170	720	504	525
80	466	472	316	260	500	1,610	2,130	1,910	2,150	1,370	842	597	658
75	526	538	394	334	580	2,060	2,740	2,370	2,650	1,670	1,010	689	820
70	600	649	480	421	720	2,470	3,210	2,770	3,430	1,920	1,120	761	1,010
60	778	907	610	650	1,100	3,670	4,150	3,890	4,660	2,410	1,410	960	1,490
50	1,080	1,200	840	850	1,520	4,800	5,020	5,060	5,980	3,210	1,740	1,310	2,090
40	1,560	1,670	1,180	1,040	2,370	6,490	6,630	6,400	7,600	4,100	2,130	1,850	3,010
30	2,180	2,180	1,570	1,400	3,490	8,580	9,490	8,200	10,500	5,320	2,860	2,620	4,420
25	2,770	2,500	1,750	1,560	4,330	10,400	11,400	9,160	12,400	6,330	3,250	3,210	5,350
20	3,480	3,040	2,110	1,800	5,200	12,500	14,000	10,500	15,200	7,580	4,180	4,120	6,610
15	4,240	3,670	2,670	2,330	6,140	16,000	17,800	12,500	18,800	9,100	5,190	5,160	8,480
10	5,690	4,490	3,230	2,900	7,610	20,400	21,400	16,000	25,000	11,200	6,670	7,030	11,500
5	7,520	8,080	5,010	4,750	9,880	27,300	29,800	24,200	33,800	14,900	9,200	11,200	18,300

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	14,500
0.90	1.11	17,800
0.80	1.25	22,600
0.50	2	35,200
0.20	5	53,700
0.10	10	66,400
0.04	25	82,600
0.02	50	94,800
0.01	100	107,000
0.005	200	120,000

Magnitude and frequency of annual high discharges, based on period of record 1918-68

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	4,550	3,180	2,230	1,600
0.95	1.05	9,220	6,960	4,900	3,540
0.90	1.11	12,800	10,000	7,100	5,150
0.80	1.25	18,300	14,800	10,600	7,780
0.50	2	32,100	27,000	20,200	15,100
0.20	5	48,500	41,700	32,800	25,100
0.10	10	57,100	49,200	39,900	31,000
0.04	25	65,600	56,600	47,300	37,300
0.02	50	70,600	60,800	51,800	41,300
0.01	100	74,600	64,000	55,600	44,700
0.005	200	77,800	66,600	58,800	47,600

05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1917 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	21	28	42	48	60	78	101	113	142
0.02	50	30	39	56	64	80	103	132	149	191
0.05	20	47	63	84	96	120	154	195	223	293
0.10	10	70	94	120	136	170	217	273	316	421
0.20	5	111	147	179	202	253	321	404	475	643
0.50	2	253	316	361	409	508	649	825	987	1,360
0.80	1.25	529	607	671	762	940	1,230	1,610	1,940	2,690
0.90	1.11	755	819	899	1,020	1,260	1,670	2,230	2,700	3,730
0.96	1.04	1,080	1,090	1,200	1,370	1,680	2,270	3,130	3,770	5,180
0.98	1.02	1,340	1,400	1,430	1,640	1,990	2,740	3,860	4,640	6,340
0.99	1.01	1,620	1,640	1,660	1,910	2,310	3,230	4,640	5,570	7,540

Magnitude and frequency of seasonal low discharges, based on period of record April 1917 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	25	42	48	63	64	175	229	276
0.02	50	36	58	66	86	108	248	314	382
0.05	20	61	93	104	136	225	406	496	611
0.10	10	97	138	155	202	405	615	731	915
0.20	5	163	221	247	324	760	985	1,140	1,460
0.50	2	412	516	579	769	2,010	2,220	2,530	3,390
0.80	1.25	953	1,130	1,280	1,740	4,020	4,460	5,160	7,310
0.90	1.11	1,430	1,660	1,900	2,610	5,250	6,150	7,260	10,600
0.96	1.04	2,140	2,460	2,840	3,980	6,550	8,410	10,200	15,500
0.98	1.02	2,740	3,140	3,650	5,180	7,330	10,100	12,600	19,500
0.99	1.01	3,390	3,890	4,540	6,530	7,960	11,900	15,100	23,900
		July-August-September				October-November-December			
0.01	100	38	90	116	166	29	64	77	100
0.02	50	55	117	147	207	40	82	97	125
0.05	20	94	171	211	287	63	117	137	176
0.10	10	147	238	288	385	94	161	185	238
0.20	5	245	353	418	550	150	236	270	346
0.50	2	587	724	838	1,090	354	495	562	722
0.80	1.25	1,250	1,430	1,640	2,160	798	1,040	1,190	1,540
0.90	1.11	1,760	2,020	2,310	3,090	1,200	1,540	1,770	2,310
0.96	1.04	2,470	2,870	3,300	4,540	1,830	2,330	2,730	3,580
0.98	1.02	3,020	3,590	4,140	5,820	2,390	3,050	3,620	4,770
0.99	1.01	3,580	4,370	5,070	7,270	3,020	3,890	4,670	6,190

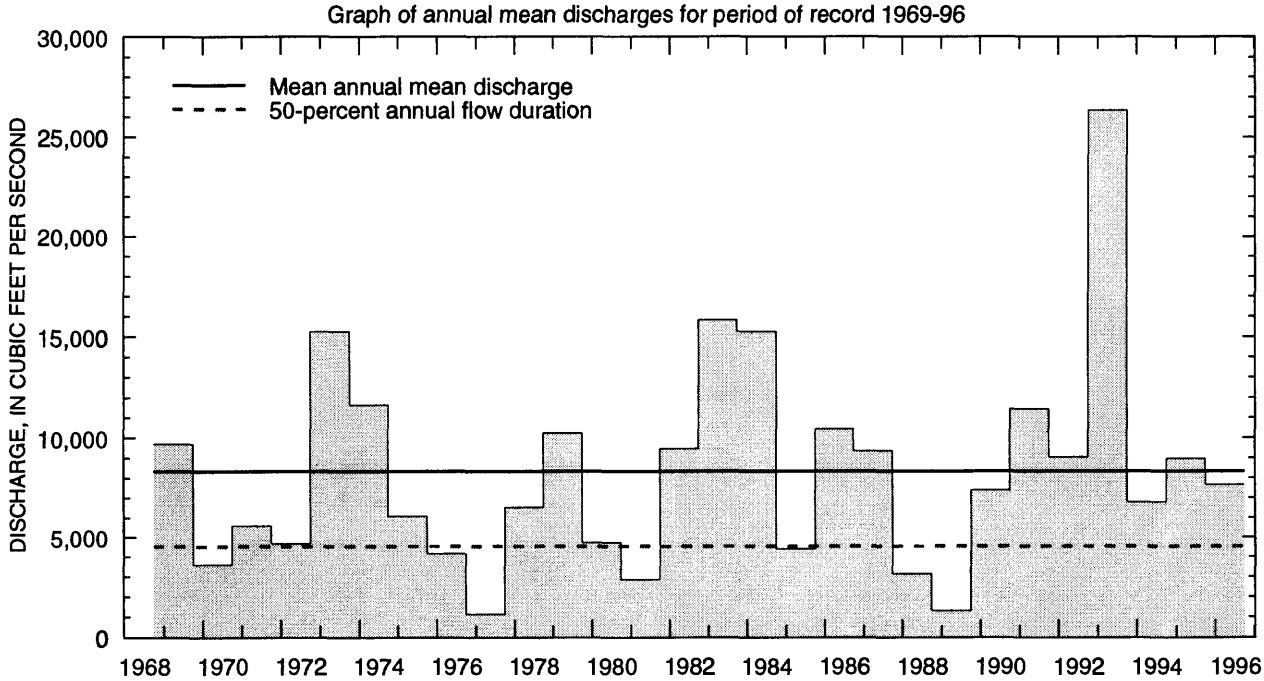
05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1969-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	18,390	1974	353	1977	4,352	4,413
November	19,250	1987	327	1977	5,265	4,956
December	13,980	1993	381	1977	4,381	3,847
January	12,380	1973	290	1977	3,005	3,175
February	16,470	1973	328	1977	4,703	4,407
March	21,750	1983	891	1977	10,070	5,866
April	25,330	1983	962	1977	12,570	7,905
May	29,770	1993	519	1977	12,640	7,296
June	31,990	1984	282	1977	13,830	8,901
July	85,570	1993	238	1977	14,580	16,230
August	47,380	1993	610	1988	9,008	9,827
September	34,790	1993	366	1976	5,248	6,656
Annual	26,350	1993	1,120	1977	8,323	5,339

Graph of annual mean discharges for period of record 1969-96



05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1969-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	280	322	281	268	269	288	568	379	230	185	240	289	279
95	364	392	418	439	490	789	1,050	1,220	1,260	474	430	380	451
90	434	700	600	600	622	1,490	2,050	2,470	2,910	1,170	578	486	691
85	535	916	950	659	750	2,160	3,200	3,740	3,570	1,470	807	640	979
80	658	1,160	1,280	739	860	3,020	4,130	4,790	4,100	2,260	1,050	896	1,280
75	837	1,400	1,500	860	980	3,680	4,880	5,480	4,960	2,910	1,350	1,040	1,620
70	1,130	1,860	1,750	967	1,100	4,550	5,440	6,360	5,940	4,020	1,610	1,180	2,130
60	1,810	2,510	2,200	1,260	1,600	6,040	7,500	8,580	10,100	7,890	3,250	1,650	3,150
50	2,570	3,130	2,850	1,600	2,200	7,790	10,600	12,600	15,400	12,700	4,580	2,450	4,530
40	3,200	3,940	3,660	2,250	2,860	10,300	14,100	16,700	17,300	16,800	7,850	3,230	6,840
30	4,390	5,850	4,900	3,000	4,600	13,400	17,800	18,000	18,600	18,400	14,000	4,300	10,700
25	5,700	7,420	5,600	3,570	5,200	15,600	18,900	18,600	19,300	19,000	16,500	5,970	13,600
20	7,050	9,290	6,990	4,300	6,630	18,200	22,300	19,100	21,500	20,300	17,100	8,170	16,500
15	8,500	11,200	8,560	5,400	9,000	20,100	24,500	20,000	22,400	21,900	17,800	10,800	18,000
10	10,800	15,100	10,500	7,400	13,600	22,600	26,200	22,500	23,600	23,800	19,000	14,300	19,800
5	17,700	17,400	14,100	10,600	21,300	25,200	28,300	26,000	31,500	35,600	22,000	17,900	24,100

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05489500 DES MOINES RIVER AT OTTUMWA, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1969 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	19	114	141	145	147	155	174	192	255
0.02	50	29	135	166	175	183	201	234	265	354
0.05	20	54	177	217	235	256	296	364	424	566
0.10	10	91	227	277	307	348	419	534	633	844
0.20	5	164	311	378	429	509	639	840	1,010	1,330
0.50	2	452	592	718	838	1,090	1,450	1,940	2,330	2,980
0.80	1.25	1,080	1,190	1,450	1,700	2,410	3,320	4,310	4,980	6,080
0.90	1.11	1,610	1,760	2,140	2,510	3,700	5,150	6,440	7,210	8,530
0.96	1.04	2,370	2,710	3,320	3,840	5,940	8,240	9,760	10,500	11,900
0.98	1.02	2,980	3,610	4,450	5,090	8,120	11,200	12,700	13,200	14,600
0.99	1.01	3,620	4,720	5,840	6,590	10,800	14,800	16,000	16,000	17,300

Magnitude and frequency of seasonal low discharges, based on period of record October 1968 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	182	234	242	242	142	187	231	270
0.02	50	213	274	284	286	232	300	371	452
0.05	20	275	352	367	386	459	584	721	917
0.10	10	349	447	470	510	803	1,010	1,240	1,620
0.20	5	476	609	648	730	1,490	1,840	2,250	2,990
0.50	2	917	1,170	1,290	1,540	4,070	4,940	5,900	7,760
0.80	1.25	1,920	2,470	2,820	3,520	9,000	10,800	12,500	15,500
0.90	1.11	2,930	3,790	4,420	5,610	12,600	15,100	17,200	20,400
0.96	1.04	4,710	6,140	7,380	9,480	17,100	20,500	22,800	25,600
0.98	1.02	6,510	8,520	10,500	13,500	20,300	24,400	26,600	28,700
0.99	1.01	8,790	11,600	14,500	18,700	23,200	27,900	30,200	31,400
		July-August-September				October-November-December			
0.01	100	64	191	191	192	20	141	160	165
0.02	50	78	219	220	230	36	182	211	226
0.05	20	108	264	279	333	79	266	317	357
0.10	10	150	324	357	471	148	372	452	531
0.20	5	231	436	501	730	293	555	692	846
0.50	2	609	914	1,100	1,790	867	1,180	1,530	1,980
0.80	1.25	1,940	2,460	2,950	4,800	1,960	2,490	3,280	4,370
0.90	1.11	3,830	4,590	5,370	8,310	2,720	3,650	4,840	6,470
0.96	1.04	8,460	9,750	10,900	15,300	3,610	5,470	7,270	9,690
0.98	1.02	14,600	16,700	17,800	23,000	4,190	7,090	9,420	12,500
0.99	1.01	24,400	27,900	28,500	33,600	4,710	8,940	11,800	15,600

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05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA

LOCATION.—Lat 40°43'40", long 91°57'34", in SE1/4 SW1/4 sec. 36, T69N, R10W, Van Buren County, Hydrologic Unit 07100009, on right bank 10 ft upstream from bridge on State Highway 1 at Keosauqua, 4.0 mi downstream from Chequest Creek, and at mile 51.3.

DRAINAGE AREA.—14,038 mi^2.

PERIOD OF RECORD.—May 1903 to July 1906, April to December 1910, August 1911 to September 1996. Monthly discharge only for some periods, published in WSP 1308.

GAGE.—Water-stage recorder. Datum of gage is 547.36 ft above sea level. Prior to December 24, 1933, nonrecording gage , and December 25, 1933 to September 30, 1972, water-stage recorder at same site at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 146,000 ft^3/s, June 1, 1903; maximum gage height, 32.66 ft; July 13, 1993; minimum daily discharge, 40 ft^3/s, January 30, 1940.

REMARKS.—Flow regulated since March 12, 1969, by dam at Lake Red Rock (station 05488100) 91.0 mi upstream.

Selected values from rating table number 4, developed October 1992

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
10.0	620	16.0	17,700
11.0	2,360	18.0	25,700
12.0	4,750	21.0	39,100
13.0	7,500	24.0	54,100
14.0	10,700	27.0	70,900
15.0	14,000	31.0	98,000

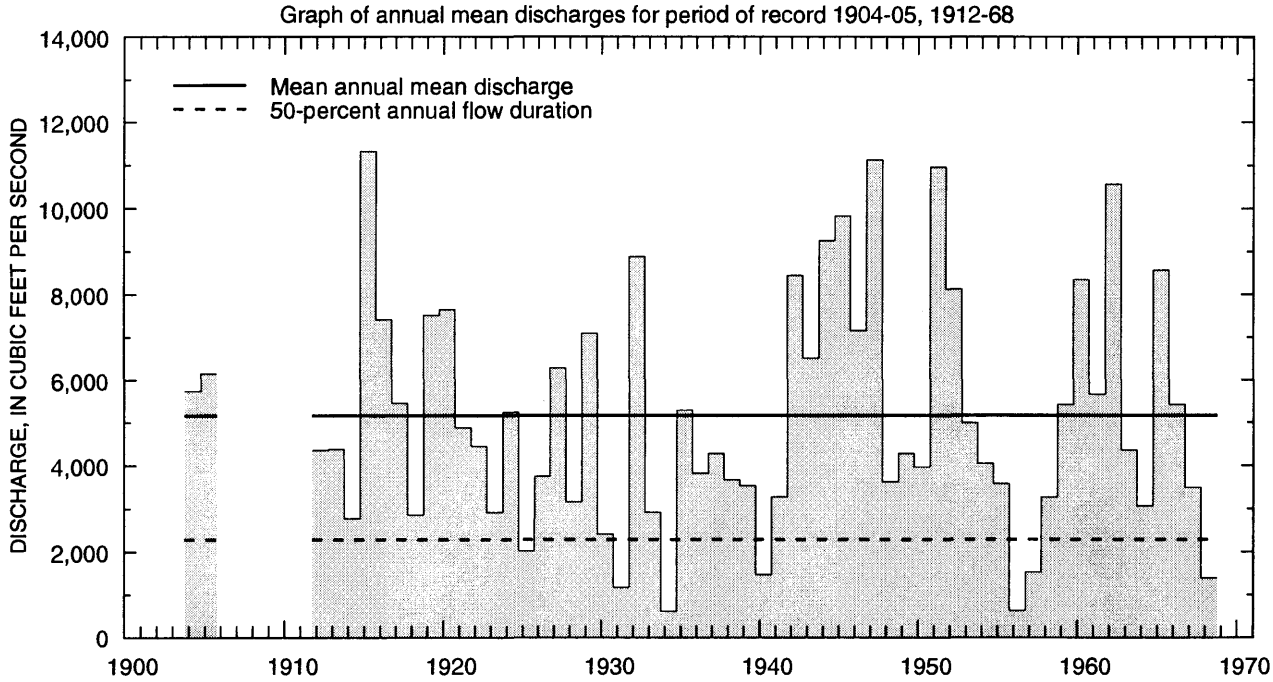
05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1904-05, 1912-68

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	13,560	1916	248	1957	2,751	2,912
November	13,370	1942	242	1956	2,503	3,006
December	9,210	1932	160	1956	1,570	1,684
January	15,890	1932	102	1940	1,781	2,590
February	15,850	1915	122	1940	3,419	2,801
March	22,230	1929	528	1934	8,761	6,109
April	40,650	1965	710	1956	9,899	8,625
May	32,370	1944	485	1934	8,229	6,509
June	58,890	1947	821	1934	10,930	9,549
July	23,200	1915	448	1956	5,646	4,838
August	16,910	1915	201	1934	3,149	2,923
September	17,850	1926	340	1955	3,311	3,501
Annual	11,320	1915	607	1934	5,159	2,739

Graph of annual mean discharges for period of record 1904-05, 1912-68



05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1904-05, 1912-68

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	170	179	110	100	110	394	567	444	442	313	180	195	138
95	299	281	170	130	220	530	1,120	682	1,020	590	424	321	295
90	384	378	250	200	350	781	1,580	1,120	1,490	936	630	442	446
85	454	460	300	250	410	1,410	1,980	1,680	1,960	1,260	766	570	590
80	521	539	375	320	530	1,830	2,500	2,240	2,600	1,470	888	655	730
75	588	610	460	400	630	2,290	3,180	2,750	3,250	1,740	1,020	742	900
70	678	690	560	480	750	2,840	3,730	3,300	3,970	2,030	1,150	835	1,100
60	920	970	700	700	1,150	4,000	4,960	4,560	5,030	2,660	1,430	1,080	1,590
50	1,250	1,300	930	880	1,510	5,510	6,230	5,770	6,520	3,430	1,740	1,450	2,280
40	1,740	1,780	1,180	1,090	2,400	7,380	7,980	7,200	8,520	4,400	2,170	2,030	3,410
30	2,790	2,280	1,590	1,480	3,780	10,400	10,600	9,050	11,400	5,820	2,960	2,900	5,000
25	3,430	2,710	1,850	1,700	4,520	12,200	12,500	10,300	13,200	7,040	3,550	3,580	6,090
20	4,260	3,360	2,140	1,950	5,750	14,000	14,500	11,800	16,200	8,250	4,570	4,380	7,550
15	5,520	3,970	2,790	2,450	6,860	17,000	18,100	14,100	19,800	9,850	5,660	5,770	9,560
10	7,200	5,000	3,420	3,200	8,520	22,300	22,100	17,600	26,900	12,300	7,380	7,780	12,800
5	9,930	8,580	5,190	5,790	11,800	27,400	31,600	25,500	37,600	18,000	10,900	12,200	19,900

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 69 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	11,100
0.95	1.05	16,100
0.90	1.11	19,500
0.80	1.25	24,600
0.50	2	37,600
0.20	5	56,600
0.10	10	69,700
0.04	25	86,600
0.02	50	99,300
0.01	100	112,000
0.005	200	125,000

Magnitude and frequency of annual high discharges, based on period of record 1904-05, 1912-68

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	6,010	4,080	3,080	2,130
0.95	1.05	11,300	8,450	6,200	4,430
0.90	1.11	15,200	11,800	8,630	6,260
0.80	1.25	21,000	17,000	12,400	9,150
0.50	2	35,000	29,800	22,300	16,800
0.20	5	51,400	44,500	35,000	26,800
0.10	10	60,000	52,000	42,300	32,500
0.04	25	68,700	59,100	50,000	38,500
0.02	50	73,800	63,100	54,800	42,200
0.01	100	78,000	66,200	58,900	45,300
0.005	200	81,500	68,700	62,400	48,000

05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1904 to March 1906, April 1912 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	34	43	57	63	77	94	118	131	167
0.02	50	46	57	73	82	98	121	152	171	222
0.05	20	70	85	106	118	142	175	221	254	336
0.10	10	100	120	145	163	194	242	306	358	480
0.20	5	152	179	210	237	282	354	450	535	728
0.50	2	320	362	408	465	556	716	924	1,120	1,540
0.80	1.25	629	686	754	862	1,050	1,400	1,840	2,230	3,070
0.90	1.11	872	932	1,020	1,170	1,450	1,950	2,610	3,160	4,290
0.96	1.04	1,210	1,270	1,380	1,580	2,010	2,760	3,750	4,510	6,050
0.98	1.02	1,480	1,530	1,670	1,910	2,470	3,430	4,710	5,630	7,470
0.99	1.01	1,760	1,800	1,970	2,260	2,960	4,160	5,780	6,850	8,990

Magnitude and frequency of seasonal low discharges, based on period of record
July 1903 to June 1906, April 1910 to December 1910, October 1911 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	37	56	64	80	134	242	283	343
0.02	50	52	76	86	106	199	328	384	469
0.05	20	86	117	131	163	348	509	595	739
0.10	10	132	170	189	237	550	737	863	1,090
0.20	5	214	263	292	372	910	1,130	1,320	1,710
0.50	2	502	578	644	865	2,070	2,370	2,790	3,800
0.80	1.25	1,060	1,190	1,350	1,970	3,950	4,530	5,400	7,840
0.90	1.11	1,510	1,700	1,960	3,010	5,210	6,160	7,370	11,100
0.96	1.04	2,140	2,440	2,860	4,700	6,680	8,320	10,000	15,800
0.98	1.02	2,640	3,050	3,630	6,250	7,670	9,980	12,100	19,500
0.99	1.01	3,160	3,710	4,470	8,060	8,570	11,600	14,200	23,500
		July-August-September				October-November-December			
0.01	100	72	139	158	196	49	77	95	120
0.02	50	95	168	192	239	65	97	118	149
0.05	20	144	225	257	323	97	138	163	205
0.10	10	207	293	337	427	137	188	219	275
0.20	5	315	410	472	604	207	272	314	394
0.50	2	683	800	925	1,210	442	552	633	800
0.80	1.25	1,410	1,630	1,890	2,530	907	1,110	1,290	1,670
0.90	1.11	2,030	2,400	2,800	3,790	1,300	1,600	1,890	2,470
0.96	1.04	2,950	3,680	4,300	5,890	1,890	2,350	2,840	3,790
0.98	1.02	3,720	4,880	5,720	7,890	2,390	3,010	3,710	5,020
0.99	1.01	4,570	6,320	7,420	10,300	2,940	3,760	4,720	6,480

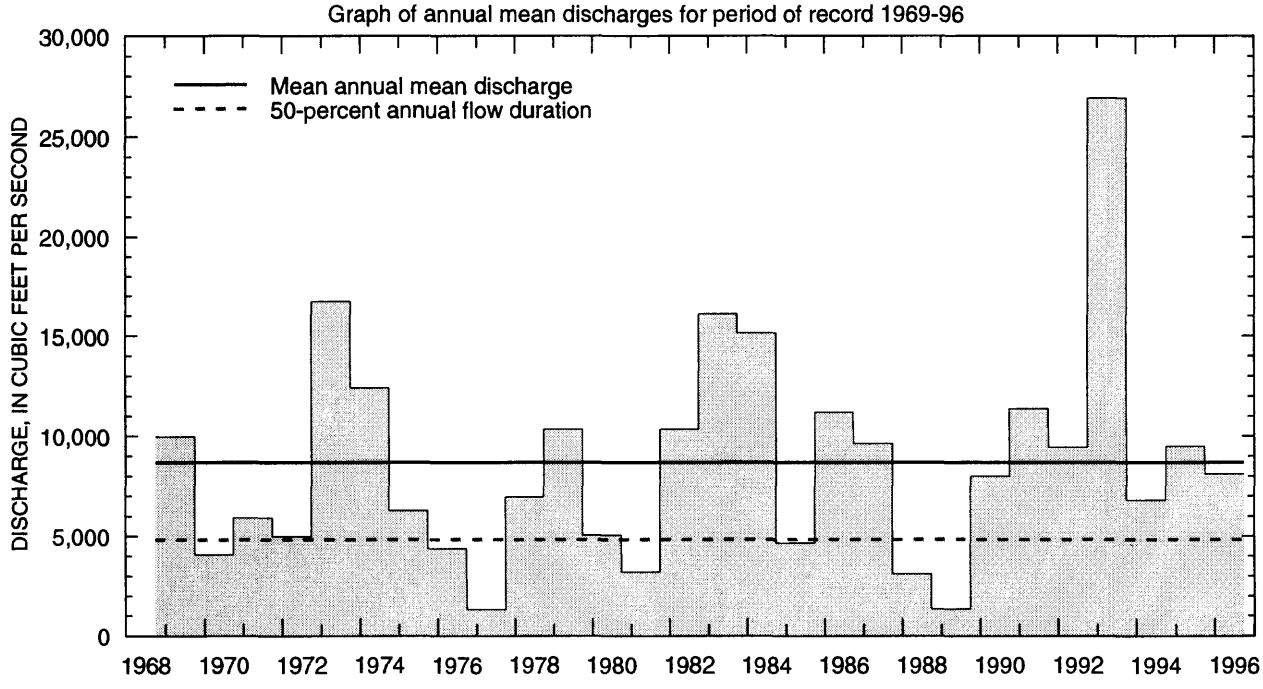
05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1969-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	19,850	1974	383	1977	4,551	4,696
November	19,320	1987	332	1977	5,409	5,052
December	14,510	1983	385	1977	4,595	3,964
January	13,120	1973	291	1977	3,154	3,296
February	17,370	1973	331	1977	5,012	4,609
March	22,200	1983	1,170	1981	10,500	6,124
April	30,030	1973	1,224	1977	13,170	8,297
May	31,260	1993	696	1977	13,440	7,911
June	30,900	1984	300	1977	14,100	8,871
July	86,150	1993	258	1977	15,160	16,360
August	47,320	1993	528	1989	9,231	9,730
September	35,210	1993	362	1976	5,674	6,756
Annual	26,920	1993	1,303	1977	8,686	5,457

Graph of annual mean discharges for period of record 1969-96



05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1969-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	319	325	295	268	270	380	629	386	266	196	318	324	298
95	370	417	418	470	540	851	1,090	1,300	1,170	479	429	388	467
90	442	686	603	584	685	1,500	2,410	2,510	3,000	1,250	631	536	740
85	563	915	1,000	710	798	2,430	3,190	3,940	3,830	1,580	907	666	1,040
80	672	1,180	1,300	830	904	3,390	4,250	4,900	4,430	2,400	1,150	885	1,370
75	909	1,520	1,580	985	1,070	4,070	5,060	5,480	5,120	3,030	1,500	1,110	1,790
70	1,120	1,870	1,840	1,070	1,290	4,780	5,830	6,430	5,980	4,310	2,000	1,370	2,300
60	1,980	2,530	2,350	1,350	1,800	6,120	7,830	8,870	10,100	8,640	3,670	1,850	3,350
50	2,700	3,220	3,020	1,750	2,500	7,800	10,700	13,000	15,800	13,800	5,160	2,660	4,820
40	3,420	4,200	3,830	2,400	3,210	10,200	14,600	16,900	17,600	17,100	8,130	3,620	7,020
30	4,540	6,010	5,110	3,200	4,880	13,500	18,000	18,300	19,000	19,000	14,300	5,270	11,000
25	5,990	7,450	5,800	3,780	5,820	16,500	19,700	18,800	19,700	19,700	16,900	6,890	14,200
20	7,170	9,060	7,000	4,500	6,990	18,800	23,100	19,700	21,700	21,400	17,600	8,380	17,000
15	8,670	11,400	8,980	5,210	9,650	21,600	25,300	21,300	22,500	22,400	18,100	12,000	18,500
10	11,300	15,700	11,000	7,210	14,100	24,000	26,900	24,900	24,700	25,400	19,100	15,200	20,800
5	18,500	18,100	14,900	10,500	22,800	25,700	29,300	31,600	31,400	37,500	21,100	19,800	25,400

Contact the U.S. Army Corps of Engineers, Rock Island District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

05490500 DES MOINES RIVER AT KEOSAUQUA, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1969 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	96	117	151	154	155	160	172	197	263
0.02	50	116	140	179	187	189	208	236	274	370
0.05	20	156	187	234	250	268	309	373	441	602
0.10	10	204	243	301	329	368	439	556	662	906
0.20	5	287	339	413	462	545	674	887	1,060	1,440
0.50	2	567	668	798	924	1,180	1,530	2,080	2,460	3,220
0.80	1.25	1,170	1,390	1,640	1,950	2,630	3,510	4,590	5,260	6,450
0.90	1.11	1,740	2,080	2,460	2,940	4,040	5,430	6,810	7,580	8,900
0.96	1.04	2,700	3,260	3,870	4,630	6,460	8,640	10,200	11,000	12,200
0.98	1.02	3,610	4,390	5,250	6,260	8,780	11,700	13,100	13,700	14,700
0.99	1.01	4,710	5,780	6,950	8,270	11,600	15,300	16,300	16,700	17,100

Magnitude and frequency of seasonal low discharges, based on period of record
October 1968 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	212	232	236	246	150	182	245	295
0.02	50	248	275	283	299	244	296	391	490
0.05	20	318	360	377	408	484	583	753	984
0.10	10	401	463	492	544	844	1,010	1,280	1,720
0.20	5	540	638	692	784	1,560	1,870	2,310	3,140
0.50	2	1,000	1,240	1,400	1,660	4,200	5,030	6,020	8,030
0.80	1.25	2,000	2,610	3,020	3,750	9,080	10,900	12,700	15,800
0.90	1.11	2,950	3,960	4,660	5,910	12,500	15,100	17,400	20,600
0.96	1.04	4,570	6,320	7,550	9,810	16,800	20,300	23,100	25,700
0.98	1.02	6,130	8,660	10,400	13,800	19,700	23,900	27,000	28,800
0.99	1.01	8,060	11,600	14,100	18,800	22,300	27,200	30,600	31,300
		July-August-September				October-November-December			
0.01	100	162	180	193	200	90	151	163	163
0.02	50	179	210	226	235	117	194	215	225
0.05	20	215	284	293	349	175	281	325	360
0.10	10	263	351	381	501	250	391	465	540
0.20	5	355	476	544	788	381	579	713	867
0.50	2	755	1,000	1,220	1,960	844	1,220	1,580	2,040
0.80	1.25	2,110	2,680	3,250	5,180	1,830	2,510	3,380	4,520
0.90	1.11	4,080	4,950	5,830	8,810	2,730	3,650	4,970	6,690
0.96	1.04	9,040	10,300	11,600	15,800	4,140	5,410	7,420	9,970
0.98	1.02	15,900	17,400	18,600	23,400	5,420	6,950	9,580	12,800
0.99	1.01	27,600	28,700	29,100	33,400	6,870	8,700	12,000	15,900

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05491000 SUGAR CREEK NEAR KEOKUK, IOWA

LOCATION.—Lat 40°26'33", long 91°28'24", in NW1/4 SE1/4 sec. 7, T65N, R5W, Lee County, Hydrologic Unit 07100009, on left bank 13 ft downstream from bridge on County Highway W62, 2.8 mi downstream from Barlean Creek, 4.6 mi upstream from mouth and 6.0 mi northwest of post office in Keokuk.

DRAINAGE AREA.—105 mi^2.

PERIOD OF RECORD.—March 1922 to September 1931, August 1958 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 510.20 ft above sea level. Prior to June 25, 1923 and November 28, 1928 to September 30, 1931, nonrecording gage; June 25, 1923 to October 8, 1928 and August 29, 1958 to October 1, 1967, water-stage recorder at site of former bridge on old channel 0.6 mi downstream at same datum. October 6, 1967 to March 11, 1968, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum recorded instantaneous discharge, 6,620 ft^3/s, October 1, 1927, gage height, 13.85 ft; no flow at times most years.

REMARKS.—Maximum discharge in period of record not determined, occurred November 17, 1928.

Selected values from rating table number 13, developed February 1971
(A discharge measurement to validate this rating has not been made since October 1974)

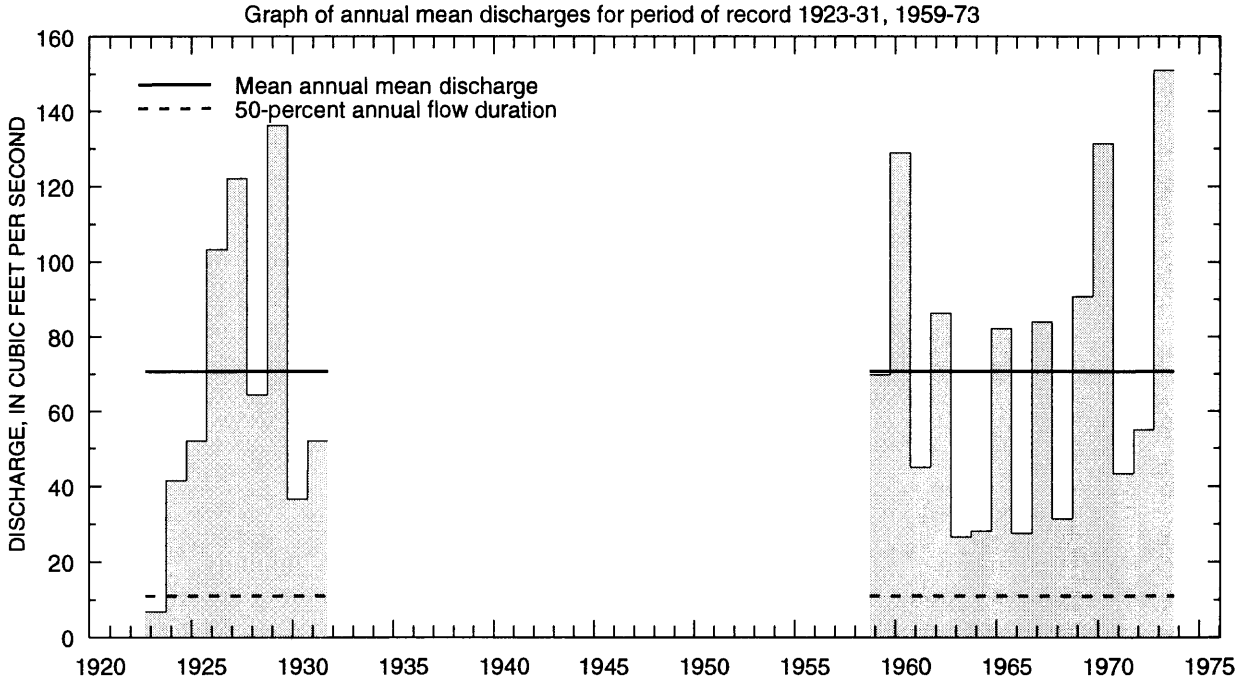
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	7.8	7.0	420
4.2	16	8.0	675
4.5	34	9.0	980
5.0	79	11.0	1,710
5.5	142	13.0	3,000
6.0	218	15.0	5,300

05491000 SUGAR CREEK NEAR KEOKUK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1923-31, 1959-73

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	329	1927	0.000	1923	67.0	97.3
November	285	1962	0.000	1964	41.2	76.8
December	113	1972	0.000	1964	25.3	28.4
January	134	1965	0.000	1964	30.6	37.6
February	219	1925	1.03	1923	75.9	65.9
March	335	1973	14.7	1964	114	90.7
April	577	1973	2.46	1923	143	146
May	385	1973	1.25	1924	68.6	92.7
June	272	1927	0.69	1963	91.0	84.3
July	317	1969	1.30	1923	63.2	89.9
August	348	1970	0.000	1963	37.2	76.2
September	626	1970	0.000	1963	93.8	167
Annual	151	1973	6.83	1923	70.7	40.7

Graph of annual mean discharges for period of record 1923-31, 1959-73



05491000 SUGAR CREEK NEAR KEOKUK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1923-31, 1959-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	3.5	0.90	0.60	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	7.2	3.4	1.0	0.40	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.10	1.4	10	6.5	2.2	1.2	0.40	0.00	0.00	0.00
85	0.00	0.20	0.40	0.47	4.0	12	8.0	3.5	1.7	0.90	0.00	0.00	0.60
80	0.00	0.60	0.70	0.92	6.0	14	10	4.8	2.7	1.4	0.00	0.00	1.1
75	0.07	0.80	1.1	1.2	8.7	16	14	6.1	4.2	1.9	0.30	0.00	1.9
70	0.70	1.0	1.9	2.3	11	19	18	7.5	5.4	2.4	0.70	0.10	3.2
60	1.6	2.3	3.3	6.0	16	30	25	11	8.4	4.0	1.4	0.80	6.6
50	3.8	6.2	5.0	10	25	37	34	15	15	7.3	2.5	2.0	11
40	9.5	11	9.0	11	40	47	49	22	27	15	4.6	5.6	17
30	17	16	12	16	64	72	74	33	49	26	8.1	14	30
25	23	19	14	21	75	90	98	39	59	32	11	19	39
20	36	27	19	30	100	120	128	51	72	37	14	30	52
15	56	42	32	40	141	174	192	78	109	50	19	54	79
10	105	64	50	68	204	275	311	126	183	84	32	134	129
5	269	190	117	107	364	445	669	297	497	228	102	531	301

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 30 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	753
0.95	1.05	1,120
0.90	1.11	1,390
0.80	1.25	1,810
0.50	2	3,020
0.20	5	5,110
0.10	10	6,760
0.04	25	9,150
0.02	50	11,100
0.01	100	13,300
0.005	200	15,700

Magnitude and frequency of annual high discharges, based on period of record 1923-31, 1959-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	198	126	75	50
0.95	1.05	365	219	130	88
0.90	1.11	492	288	172	116
0.80	1.25	691	395	237	159
0.50	2	1,230	688	419	274
0.20	5	2,010	1,120	697	439
0.10	10	2,520	1,410	890	546
0.04	25	3,120	1,770	1,140	675
0.02	50	3,540	2,030	1,320	767
0.01	100	3,930	2,280	1,500	853
0.005	200	4,300	2,520	1,680	936

05491000 SUGAR CREEK NEAR KEOKUK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1922 to March 1931, April 1959 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.22	0.24
0.10	10	0.00	0.00	0.00	0.00	0.00	0.12	0.53	1.0	1.3
0.20	5	0.00	0.00	0.00	0.00	0.00	0.39	1.2	2.5	3.6
0.50	2	0.00	0.00	0.00	0.00	0.46	2.2	4.5	9.4	15
0.80	1.25	0.55	0.73	1.0	1.6	3.1	8.8	16	26	49
0.90	1.11	0.85	1.0	1.5	2.5	6.9	16	30	42	84
0.96	1.04	1.1	1.3	1.9	3.7	14	30	59	70	141
0.98	1.02	1.3	1.4	2.1	4.6	21	43	92	120	194
0.99	1.01	1.3	1.4	2.2	5.6	31	58	138	170	254

Magnitude and frequency of seasonal low discharges, based on period of record April 1922 to September 1931, September 1958 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.29
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.45
0.05	20	0.00	0.00	0.00	0.03	0.00	0.00	0.10	0.89
0.10	10	0.00	0.00	0.00	0.37	0.00	0.15	0.28	1.6
0.20	5	0.00	0.00	0.46	1.5	0.42	0.65	0.89	3.2
0.50	2	2.5	2.9	3.8	9.6	2.3	3.3	5.4	12
0.80	1.25	6.4	8.0	12	32	8.0	12	20	41
0.90	1.11	9.5	13	18	52	15	22	34	77
0.96	1.04	14	20	25	76	28	39	53	147
0.98	1.02	17	27	40	93	44	57	80	223
0.99	1.01	21	36	70	108	66	80	150	321
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.05
0.50	2	0.06	0.11	0.37	1.1	0.54	0.56	1.3	2.7
0.80	1.25	1.1	2.1	2.7	6.0	3.6	5.5	9.4	18
0.90	1.11	2.3	3.9	5.1	13	6.6	9.5	19	38
0.96	1.04	4.7	6.1	9.1	25	12	14	34	71
0.98	1.02	7.0	8.0	12	38	16	20	47	102
0.99	1.01	10	12	17	54	21	35	60	138

05494300 FOX RIVER AT BLOOMFIELD, IOWA

LOCATION.—Lat 40°46'10", long 92°25'05", in SW1/4 SE1/4 sec. 13, T69N R14W, Davis County, Hydrologic Unit 07110001, on left bank 15 ft downstream from bridge on County Highway V20, 1.3 mi northwest of county court house at Bloomfield and 8.6 mi downstream from North Fox Creek.

DRAINAGE AREA.—87.7 mi^2.

PERIOD OF RECORD.—October 1957 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 755.57 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,600 ft^3/s, May 6, 1960, gage height, 24.02 ft, from rating curve extended above 5,400 ft^3/s on basis of slope-area measurement of peak flow; no flow October 1–14, 18–21, 1957, June 30, 1958, August 29–31, 1961, many days during September 1966.

REMARKS.—Gage reactivated May 1997.

Selected values from rating table number 9, developed October 1997

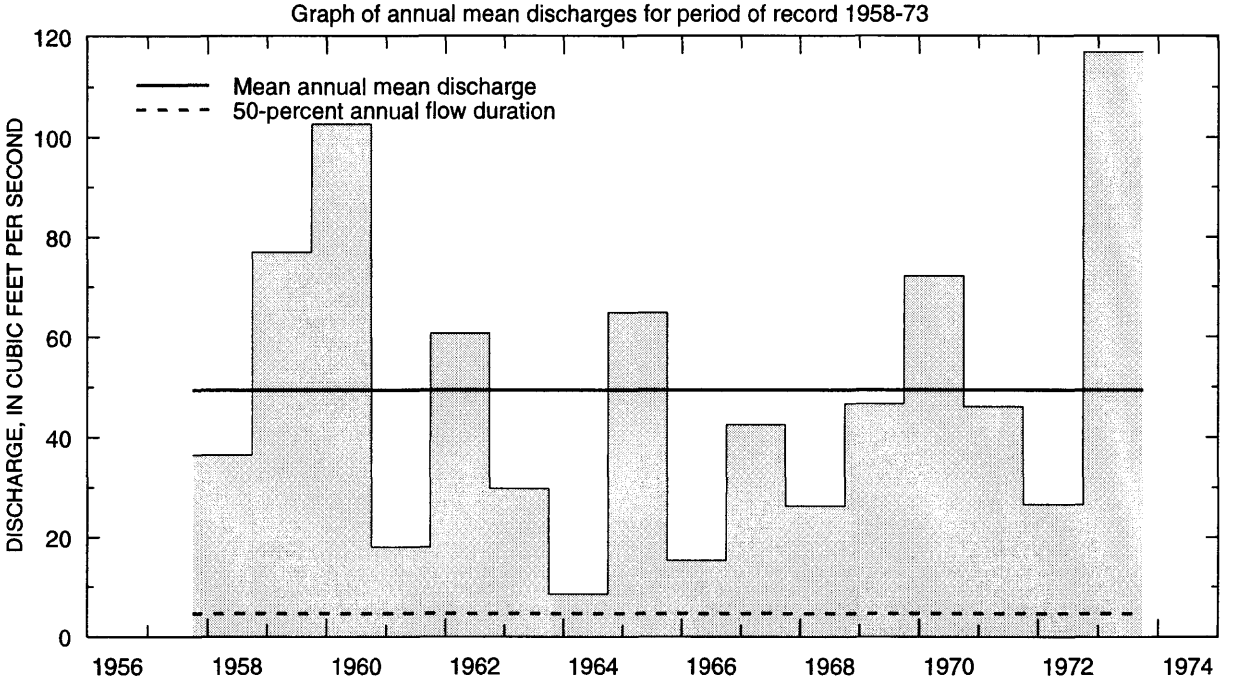
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.8	3.30	4.5	144
3.0	9.12	5.0	224
3.5	36.2	5.5	322
4.0	81.1		

05494300 FOX RIVER AT BLOOMFIELD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1958-73

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	178	1960	0.21	1964	32.3	57.4
November	222	1962	0.53	1965	24.2	54.3
December	115	1971	0.32	1964	23.4	35.7
January	127	1973	0.59	1964	29.8	39.7
February	158	1959	0.67	1964	61.7	56.1
March	291	1960	1.07	1964	102	93.8
April	370	1973	8.48	1971	98.6	106
May	325	1973	2.35	1964	71.1	98.1
June	179	1967	0.73	1963	31.7	45.0
July	163	1969	1.09	1972	30.7	52.9
August	254	1970	0.20	1961	38.5	81.8
September	377	1970	0.78	1969	49.8	99.4
Annual	117	1973	8.40	1964	49.4	31.1

Graph of annual mean discharges for period of record 1958-73



05494300 FOX RIVER AT BLOOMFIELD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1958-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.16	0.10	0.20	0.50	0.90	0.38	0.40	0.30	0.10	0.06	0.00	0.10
95	0.08	0.30	0.20	0.40	0.60	1.1	3.3	1.4	0.50	0.27	0.10	0.10	0.20
90	0.11	0.40	0.40	0.55	0.90	2.6	5.7	2.5	0.70	0.40	0.15	0.14	0.40
85	0.30	0.50	0.60	0.76	1.7	5.4	6.6	3.5	0.75	0.50	0.20	0.20	0.60
80	0.32	0.60	0.70	0.88	2.8	8.6	8.6	5.1	1.0	0.60	0.29	0.31	0.80
75	0.49	0.78	1.0	1.1	3.8	10	10	5.9	1.1	0.70	0.30	0.40	1.0
70	0.60	1.0	1.4	1.3	4.7	13	12	7.2	1.2	0.80	0.40	0.50	1.3
60	1.1	1.5	1.8	2.0	7.0	17	17	9.6	1.8	1.0	0.70	0.80	2.3
50	1.8	2.2	2.4	3.2	18	22	22	13	2.7	1.4	1.1	1.1	4.5
40	2.6	4.5	3.7	7.0	30	31	31	17	4.5	1.9	1.7	1.9	8.5
30	4.8	8.0	6.8	13	45	46	42	25	8.1	3.9	2.8	4.0	15
25	7.1	11	8.7	20	56	64	54	34	12	5.9	3.5	5.4	20
20	10	14	12	30	70	90	70	43	21	9.3	4.9	8.4	30
15	15	18	15	39	90	141	109	60	33	13	8.8	15	43
10	29	24	22	65	148	258	212	101	61	21	21	38	75
5	92	56	65	122	285	487	563	252	140	57	89	190	198

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 21 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	345
0.95	1.05	670
0.90	1.11	934
0.80	1.25	1,370
0.50	2	2,710
0.20	5	4,970
0.10	10	6,650
0.04	25	8,890
0.02	50	10,600
0.01	100	12,400
0.005	200	14,100

Magnitude and frequency of annual high discharges, based on period of record 1958-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	107	62	36	31
0.95	1.05	238	129	79	59
0.90	1.11	348	184	114	81
0.80	1.25	530	273	171	116
0.50	2	1,050	522	328	210
0.20	5	1,810	880	541	341
0.10	10	2,270	1,100	665	424
0.04	25	2,790	1,360	799	519
0.02	50	3,130	1,530	882	583
0.01	100	3,430	1,680	954	641
0.005	200	3,700	1,810	1,020	694

05494300 FOX RIVER AT BLOOMFIELD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.01	0.03	0.14	0.21	0.22	0.22	0.24
0.02	50	0.00	0.00	0.01	0.04	0.16	0.25	0.25	0.27	0.34
0.05	20	0.00	0.00	0.03	0.06	0.19	0.32	0..39	0.41	0.57
0.10	10	0.00	0.00	0.05	0.09	0.23	0.41	0.54	0.58	0.92
0.20	5	0.00	0.06	0.08	0.14	0.29	0.57	0.79	0.98	1.7
0.50	2	0.10	0.14	0.23	0.33	0.56	1.2	2.0	3.0	5.8
0.80	1.25	0.29	0.34	0.54	0.70	1.3	2.7	6.5	11	22
0.90	1.11	0.52	0.59	0.78	1.0	2.1	4.4	14	24	47
0.96	1.04	0.98	1.1	1.1	1.5	4.0	7.6	32	57	108
0.98	1.02	1.5	1.6	1.6	2.4	6.2	11	59	103	188
0.99	1.01	2.5	2.5	2.6	3.0	9.4	16	105	179	313

Magnitude and frequency of seasonal low discharges, based on period of record October 1957 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.06	0.11	0.17	0.18	0.00	0.15	0.15	0.15
0.02	50	0.09	0.13	0.20	0.27	0.00	0.24	0.24	0.24
0.05	20	0.13	0.19	0.27	0.48	0.00	0.36	0.43	0.47
0.10	10	0.21	0.27	0.37	0.81	0.23	0.45	0.57	0.85
0.20	5	0.35	0.44	0.59	1.5	0.40	0.61	0.83	1.7
0.50	2	1.1	1.3	1.7	5.5	0.86	1.1	1.8	6.1
0.80	1.25	3.8	4.8	6.6	20	1.6	2.3	4.2	20
0.90	1.11	7.6	11	15	40	2.2	3.3	6.9	37
0.96	1.04	17	26	41	85	3.0	5.0	12	69
0.98	1.02	28	48	82	140	3.6	6.7	17	101
0.99	1.01	46	87	158	219	4.2	8.7	24	142
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.03	0.15	0.00	0.00	0.00	0.09
0.02	50	0.00	0.01	0.04	0.17	0.00	0.00	0.00	0.12
0.05	20	0.00	0.03	0.07	0.21	0.00	0.00	0.00	0.19
0.10	10	0.00	0.05	0.10	0.25	0.04	0.06	0.11	0.30
0.20	5	0.05	0.10	0.17	0.35	0.11	0.18	0.29	0.51
0.50	2	0.19	0.32	0.43	0.81	0.52	0.76	1.2	1.6
0.80	1.25	0.53	0.83	1.1	2.6	1.8	2.5	3.9	5.8
0.90	1.11	0.91	1.3	1.7	5.7	3.4	4.4	7.4	12
0.96	1.04	1.6	1.9	2.7	15	6.3	7.7	14	27
0.98	1.02	2.2	2.5	3.7	29	9.3	11	22	47
0.99	1.01	3.1	3.4	4.8	55	13	15	32	78

05494500 FOX RIVER AT CANTRIL, IOWA

LOCATION.—Lat 40°39'35", long 92°03'40", in SW1/4 sec. 30, T68N, R10W, Van Buren County, Hydrologic Unit 07110002, on left bank 5 ft downstream from bridge on State Highway 2, 0.3 mi upstream from Bone Run and 1.0 mi northeast of Cantril.

DRAINAGE AREA.—161 mi^2.

PERIOD OF RECORD.—August 1940 to September 1951 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 657.98 ft above sea level. Prior to November 8, 1940, wire weight gage on downstream side of bridge at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 16,500 ft^3/s, June 18, 1946, 0.00 ft/s, August 9–16, 31–September 3, 1941; no flow August 9–-14, 31–September 3, 1941.

Selected values from rating table developed February 1950
(A discharge measurement to validate this rating has not been made since December 1952)

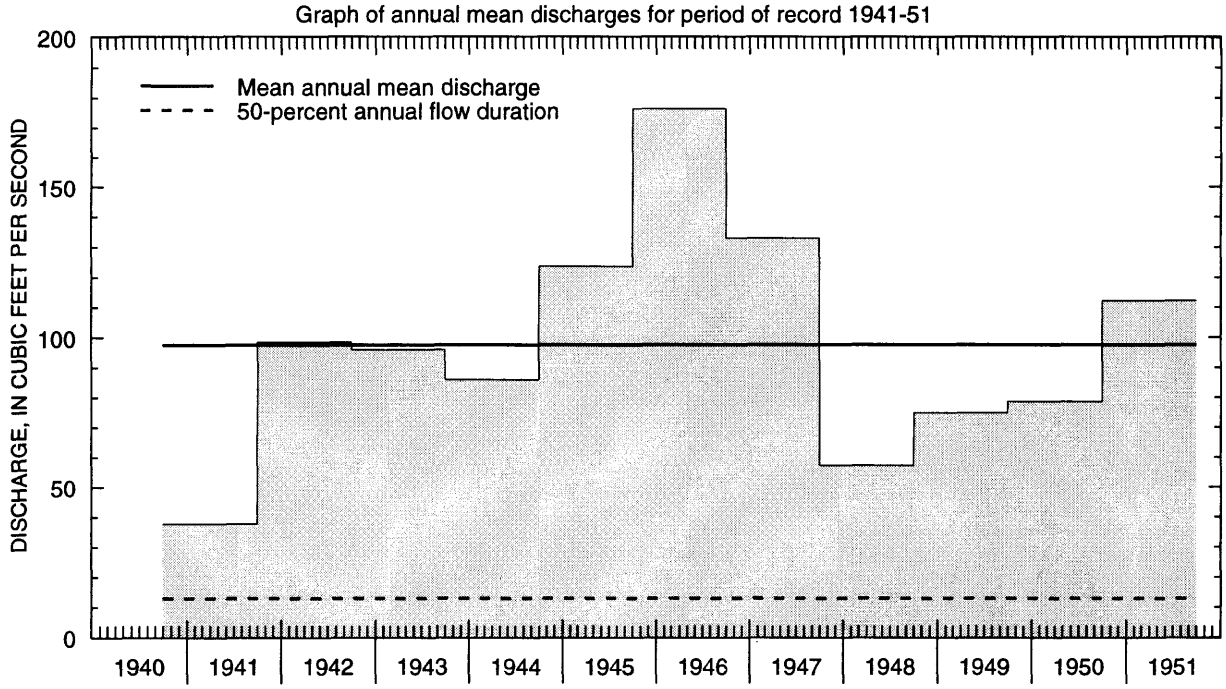
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	11	8.0	1,520
3.0	30	10.0	2,480
3.5	78	12.0	3,500
4.0	165	14.0	4,900
4.5	280	16.0	7,200
5.0	410	18.0	11,700
6.0	740		

05494500 FOX RIVER AT CANTRIL, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-51

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	369	1942	1.05	1943	44.6	110
November	161	1942	1.48	1941	25.9	47.5
December	89.8	1943	1.02	1951	33.7	38.3
January	225	1946	1.08	1951	45.4	65.9
February	250	1945	13.6	1947	135	89.0
March	376	1946	9.78	1941	145	109
April	635	1944	32.2	1942	160	189
May	335	1945	20.1	1949	116	111
June	920	1947	11.0	1948	336	290
July	439	1946	2.97	1944	91.5	137
August	152	1951	0.31	1941	26.3	47.2
September	83.0	1941	1.32	1942	20.5	23.3
Annual	176	1946	37.7	1941	97.7	38.2

Graph of annual mean discharges for period of record 1941-51



05494500 FOX RIVER AT CANTRIL, IOWA—Continued

Monthly and annual flow durations, based on period of record 1941-51

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.54	0.80	0.50	0.30	0.60	3.3	7.6	2.7	0.23	0.50	0.00	0.25	0.40
95	0.80	1.0	0.70	0.60	1.0	7.7	10	5.6	2.9	0.90	0.21	0.90	0.90
90	0.90	1.5	0.90	0.90	4.0	12	15	8.6	3.3	2.4	0.90	1.1	1.5
85	1.0	1.7	1.0	1.2	6.0	16	17	12	6.2	3.6	1.1	1.5	2.2
80	1.2	1.9	1.1	2.7	9.0	19	21	14	8.8	4.3	1.7	1.7	3.0
75	1.5	2.6	1.5	4.0	10	26	26	16	15	5.1	2.2	2.0	3.5
70	2.0	2.8	2.0	5.6	12	34	28	18	17	5.6	2.6	2.4	4.6
60	2.6	3.3	3.1	8.4	20	44	36	22	21	7.6	3.3	3.0	7.8
50	3.1	4.4	4.1	11	35	62	45	28	31	12	4.3	3.3	13
40	3.9	6.2	7.0	17	52	76	58	34	59	15	5.4	4.7	21
30	5.0	9.6	10	24	78	106	75	46	119	23	7.9	7.6	34
25	5.9	14	14	28	94	119	88	58	178	29	9.4	9.6	45
20	6.5	18	19	35	111	149	119	75	316	37	11	12	62
15	11	28	25	46	150	215	164	97	510	46	16	17	87
10	38	38	56	64	385	329	284	172	813	76	30	23	144
5	130	73	131	153	645	681	624	444	1,630	206	78	56	400

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 11 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,230
0.95	1.05	3,050
0.90	1.11	3,600
0.80	1.25	4,380
0.50	2	6,340
0.20	5	9,080
0.10	10	10,900
0.04	25	13,200
0.02	50	15,000
0.01	100	16,700
0.005	200	18,500

Magnitude and frequency of annual high discharges, based on period of record 1941-51

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	709	495	293	162
0.95	1.05	908	608	355	220
0.90	1.11	1,050	688	399	259
0.80	1.25	1,290	812	467	317
0.50	2	1,990	1,160	665	469
0.20	5	3,340	1,780	1,020	700
0.10	10	4,520	2,290	1,310	866
0.04	25	6,410	3,050	1,750	1,090
0.02	50	8,140	3,710	2,150	1,260
0.01	100	10,200	4,470	2,600	1,450
0.005	200	12,600	5,330	3,120	1,640

05494500 FOX RIVER AT CANTRIL, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1941 to March 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.03	0.11	0.33	0.41	0.47	0.87
0.02	50	0.00	0.00	0.00	0.05	0.17	0.46	0.56	0.66	1.3
0.05	20	0.00	0.00	0.00	0.11	0.29	0.73	0.89	1.1	2.2
0.10	10	0.00	0.00	0.00	0.20	0.47	1.1	1.3	1.7	3.5
0.20	5	0.17	0.25	0.36	0.40	0.78	1.7	2.2	2.9	5.9
0.50	2	0.51	0.57	0.68	1.1	1.8	3.6	5.4	8.2	15
0.80	1.25	1.1	1.1	1.2	2.1	3.6	7.1	13	23	32
0.90	1.11	1.5	1.6	1.7	2.6	4.8	9.7	21	39	46
0.96	1.04	2.0	2.2	2.5	3.1	6.3	13	34	68	70
0.98	1.02	2.4	2.8	3.1	3.4	7.3	16	45	97	110
0.99	1.01	2.8	3.4	4.0	5.0	8.3	18	60	135	150

Magnitude and frequency of seasonal low discharges, based on period of record October 1940 to September 1951

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.09	0.10	0.52	0.02	0.19	0.95	1.7
0.02	50	0.12	0.14	0.17	0.79	0.07	0.36	1.4	2.6
0.05	20	0.22	0.29	0.36	1.4	0.25	0.84	2.4	4.8
0.10	10	0.38	0.52	0.66	2.4	0.67	1.6	3.8	7.8
0.20	5	0.72	1.0	1.3	4.4	1.8	3.2	6.3	13
0.50	2	2.3	3.3	4.5	13	6.8	8.9	14	33
0.80	1.25	6.8	9.1	13	34	13	17	26	68
0.90	1.11	12	15	22	54	16	22	34	93
0.96	1.04	20	23	35	87	17	26	43	123
0.98	1.02	29	31	46	116	18	28	49	145
0.99	1.01	39	39	59	149	18	29	54	165
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.03	0.15	0.23	0.27	0.39	0.55
0.02	50	0.00	0.00	0.05	0.23	0.27	0.31	0.44	0.62
0.05	20	0.00	0.00	0.15	0.42	0.35	0.41	0.53	0.77
0.10	10	0.30	0.31	0.32	0.69	0.44	0.52	0.65	0.96
0.20	5	0.60	0.55	0.71	1.2	0.61	0.73	0.86	1.3
0.50	2	1.2	1.5	2.2	3.0	1.2	1.5	1.6	2.9
0.80	1.25	2.4	3.1	4.5	6.3	2.7	3.3	3.7	7.9
0.90	1.11	3.6	4.8	5.6	8.7	4.2	5.4	6.1	15
0.96	1.04	5.7	6.0	6.6	12	7.0	9.2	11	31
0.98	1.02	6.0	6.5	7.0	14	9.9	13	17	53
0.99	1.01	7.3	7.4	7.3	16	14	19	25	89

06483270 ROCK RIVER AT ROCK RAPIDS, IOWA

LOCATION.—Lat 43°26'13", long 96°09'58", in NE1/4 SW1/4 sec. 33, T100N, R45W, Lyon County, Hydrologic Unit 10170204, on right bank at dam on north side of city park in Rock Rapids, 0.3 mi upstream from Tom Creek, 0.5 mi northeast of junction of U.S. Highway 75 and State Highway 9, and at mile 42.8.

DRAINAGE AREA.—788 mi^2.

PERIOD OF RECORD.—August 1959 to September 1974 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1.331.55 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 29,000 ft^3/s, April 8, 1969, gage height, 10.23 ft; minimum daily discharge, 0.8 ft^3/s, February 1–5, 1965.

Selected values from rating table number 5, developed May 1969
(A discharge measurement to validate this rating has not been made since September 1975)

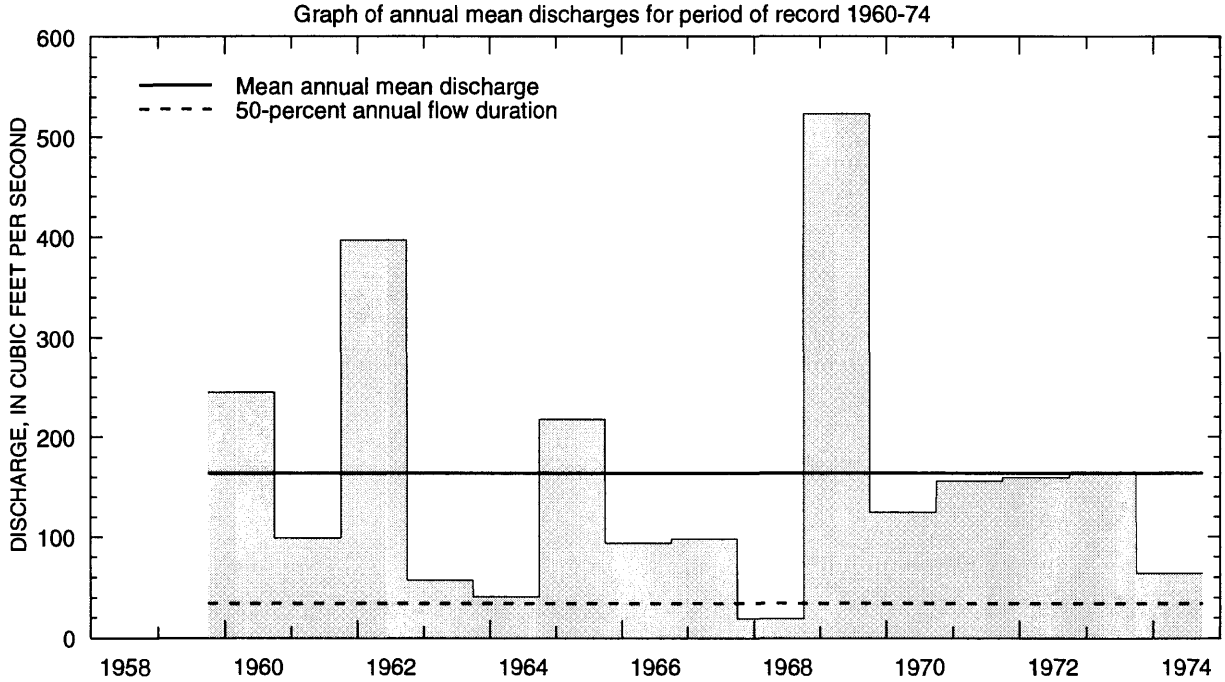
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.6	4.1	3.0	1,410
1.7	26	3.5	2,280
1.8	70	4.0	3,280
1.9	130	5.0	5,520
2.0	206	6.0	8,000
2.2	380	8.0	13,200
2.5	710	10.0	25,600

06483270 ROCK RIVER AT ROCK RAPIDS, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1960-74

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	438	1969	5.45	1968	66.8	106
November	163	1969	8.76	1968	60.7	55.8
December	55.2	1971	6.29	1965	27.1	15.5
January	107	1973	2.21	1968	18.9	25.2
February	595	1966	1.59	1965	84.3	165
March	1,082	1962	22.4	1968	379	371
April	3,730	1969	37.8	1968	697	1,022
May	596	1972	26.9	1968	204	189
June	770	1969	21.6	1964	223	219
July	714	1969	8.61	1974	141	190
August	92.0	1969	8.97	1964	36.4	27.0
September	86.8	1964	5.50	1967	32.0	25.1
Annual	523	1969	19.1	1968	164	138

Graph of annual mean discharges for period of record 1960-74



06483270 ROCK RIVER AT ROCK RAPIDS, IOWA—Continued

Monthly and annual flow durations, based on period of record 1960-74

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	3.5	7.2	3.0	1.3	0.80	2.9	27	16	9.6	4.6	4.1	3.8	2.0
95	7.0	8.8	5.0	2.2	2.0	7.0	42	23	17	6.7	5.4	4.8	5.4
90	13	13	7.0	3.7	3.0	9.0	53	32	22	8.8	8.8	6.5	7.5
85	16	15	9.1	5.4	4.1	14	71	42	26	14	10	8.1	10
80	17	20	13	5.5	5.4	19	82	47	33	20	12	9.5	14
75	20	22	15	6.2	6.0	20	93	58	42	26	14	11	16
70	22	25	15	7.0	6.5	23	106	65	46	30	15	12	19
60	28	30	17	9.2	8.0	58	130	82	65	42	19	14	25
50	31	34	21	14	9.0	100	166	111	88	55	24	19	34
40	36	42	26	16	14	140	200	150	118	70	28	25	50
30	46	53	29	17	20	200	312	191	168	101	37	35	80
25	49	70	31	19	22	240	357	216	214	134	42	42	100
20	57	92	34	22	32	316	460	256	256	174	53	46	136
15	68	111	38	22	67	450	803	352	343	248	62	55	183
10	99	152	46	25	152	698	1,370	429	423	339	80	70	270
5	210	199	75	49	250	1,540	3,300	680	666	491	106	98	478

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 23 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	1,040
0.80	1.25	1,640
0.50	2	3,850
0.20	5	8,670
0.10	10	13,100
0.04	25	20,000
0.02	50	26,100
0.01	100	33,100
0.005	200	40,900

Magnitude and frequency of annual high discharges, based on period of record 1960-74

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	72	58	35	22
0.95	1.05	219	156	98	65
0.90	1.11	384	260	166	113
0.80	1.25	737	479	307	211
0.50	2	2,370	1,480	943	627
0.20	5	6,890	4,380	2,690	1,630
0.10	10	11,600	7,580	4,530	2,560
0.04	25	19,500	13,400	7,720	3,980
0.02	50	26,000	19,200	10,800	5,200
0.01	100	33,000	26,400	14,400	6,520
0.005	200	40,800	35,300	18,700	7,950

06483270 ROCK RIVER AT ROCK RAPIDS, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1960 to March 1974

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.47	0.47	0.54	0.61	0.88	1.4	2.0	3.1	4.1
0.02	50	0.65	0.65	0.74	0.84	1.2	1.8	2.6	3.9	5.4
0.05	20	1.0	1.0	1.2	1.3	1.8	2.7	3.9	5.6	8.0
0.10	10	1.5	1.5	1.7	1.9	2.5	3.8	5.4	7.5	11
0.20	5	2.2	2.3	2.6	2.9	3.8	5.5	7.9	11	16
0.50	2	4.4	4.8	5.3	6.0	7.6	11	15	20	28
0.80	1.25	8.1	9.0	10	11	14	19	27	35	44
0.90	1.11	11	12	13	14	18	25	34	47	54
0.96	1.04	14	16	18	19	24	32	44	62	64
0.98	1.02	17	19	21	22	28	37	51	74	77
0.99	1.01	19	22	24	25	32	43	58	86	90

Magnitude and frequency of seasonal low discharges, based on period of record September 1959 to September 1974

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.41	0.48	0.63	1.1	4.4	5.9	7.3	9.9
0.02	50	0.60	0.69	0.85	1.4	5.6	7.5	9.0	12
0.05	20	1.0	1.2	1.3	1.9	8.0	11	13	17
0.10	10	1.6	1.8	2.0	2.7	11	14	17	23
0.20	5	2.7	2.9	3.1	3.9	16	21	24	34
0.50	2	6.3	6.8	7.2	8.4	35	42	49	69
0.80	1.25	13	14	16	19	73	85	98	145
0.90	1.11	18	19	24	28	109	123	142	216
0.96	1.04	24	26	36	45	165	182	211	332
0.98	1.02	29	32	46	60	217	234	273	441
0.99	1.01	34	37	58	79	277	293	344	570
		July-August-September				October-November-December			
0.01	100	1.5	2.1	2.7	3.8	0.85	1.8	2.0	3.0
0.02	50	1.7	2.5	3.1	4.2	1.3	2.4	2.7	4.0
0.05	20	2.2	3.1	3.8	5.1	2.3	3.7	4.2	5.8
0.10	10	2.8	3.9	4.7	6.1	3.6	5.2	6.0	7.9
0.20	5	3.8	5.2	6.1	7.7	5.7	7.5	8.8	11
0.50	2	7.2	9.3	11	13	11	13	16	21
0.80	1.25	15	18	20	24	18	19	25	36
0.90	1.11	23	25	28	34	21	22	30	45
0.96	1.04	36	38	41	51	23	25	34	57
0.98	1.02	50	50	53	68	24	26	37	66
0.99	1.01	67	67	68	88	25	28	39	74

06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA

LOCATION.—Lat 43°12'52", long 96°17'39", in SW1/4 SW1/4 sec. 16, T97N, R46W, Sioux County, Hydrologic Unit 10170204, on left bank 3 ft upstream from bridge on County Highway K30, 0.3 mi north of Rock Valley and at mile 19.1.

DRAINAGE AREA.—1592 mi^2.

PERIOD OF RECORD.—July 1948 to September 1996

GAGE.—Water-stage recorder. Datum of gage is 1,222.54 ft above sea level. Prior to August 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949 to August 12, 1952 and August 13, 1952 to May 4, 1976, water-stage recorder at site 3.2 mi downstream at datum 10.73 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 40,400 ft^3/s, April 7, 1969, gage height, 17.32 ft; no flow February 20–23, 27–March 8, 1959, January 9–February 2, 1977.

Selected values from rating table number 22, developed March 1994

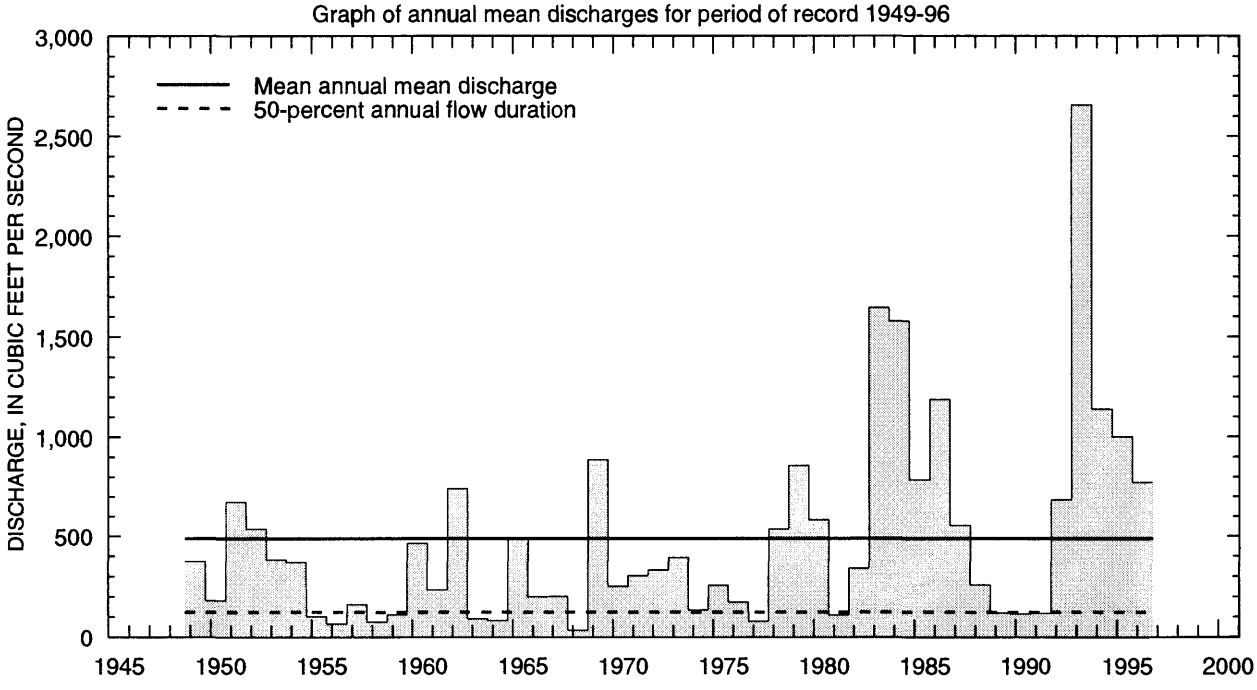
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.6	25.5	8.0	2,020
3.0	46.3	10.0	3,450
4.0	195	12.0	6,270
5.0	523	15.0	12,700
6.0	1,010	19.0	26,000

06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1949-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,232	1993	2.39	1959	241	346
November	2,039	1980	9.70	1959	245	395
December	676	1983	3.22	1959	137	184
January	434	1996	0.037	1977	77.3	110
February	1,059	1966	0.30	1959	211	289
March	3,421	1983	35.1	1959	987	868
April	6,507	1969	35.9	1959	1,225	1,460
May	3,728	1993	44.4	1968	651	783
June	6,495	1993	46.3	1964	942	1,354
July	9,088	1993	21.9	1976	604	1,363
August	2,251	1993	6.79	1976	275	448
September	2,135	1986	3.26	1955	247	432
Annual	2,656	1993	31.0	1968	487	503

Graph of annual mean discharges for period of record 1949-96



06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1949-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	2.7	6.4	2.2	0.00	0.05	1.0	33	34	20	14	4.0	2.2	1.4
95	10	12	4.5	1.4	1.2	7.7	68	52	44	21	9.6	4.4	7.5
90	15	22	10	4.0	6.0	17	108	76	54	31	17	15	15
85	22	28	15	7.0	7.4	30	134	94	75	40	28	21	22
80	30	34	20	8.5	10	50	166	116	99	55	38	26	30
75	35	40	23	10	11	70	201	140	126	70	45	31	39
70	41	46	29	13	15	95	231	162	149	87	53	36	49
60	56	57	39	20	20	200	314	235	212	129	69	54	74
50	70	74	48	27	27	314	449	320	310	176	98	76	122
40	97	103	64	37	50	470	656	416	449	246	134	95	199
30	159	160	105	60	150	752	930	589	636	386	195	158	305
25	213	228	154	75	188	929	1,200	714	800	483	241	196	400
20	310	322	220	130	260	1,200	1,500	920	1,000	676	295	259	536
15	532	508	300	203	315	1,680	1,990	1,200	1,350	969	390	357	768
10	848	748	421	250	500	2,520	2,910	1,530	2,160	1,240	593	587	1,100
5	1,110	1,030	600	300	933	4,430	4,930	2,160	3,980	1,900	1,210	1,080	1,910

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 54 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,030
0.90	1.11	1,600
0.80	1.25	2,650
0.50	2	6,460
0.20	5	14,300
0.10	10	20,800
0.04	25	30,400
0.02	50	38,100
0.01	100	46,400
0.005	200	55,000

Magnitude and frequency of annual high discharges, based on period of record 1949-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	165	134	100	77
0.95	1.05	529	399	281	206
0.90	1.11	925	677	467	334
0.80	1.25	1,720	1,220	830	577
0.50	2	4,760	3,310	2,210	1,480
0.20	5	10,800	7,500	5,080	3,330
0.10	10	15,300	10,800	7,430	4,830
0.04	25	21,100	15,200	10,700	6,940
0.02	50	25,300	18,500	13,200	8,600
0.01	100	29,200	21,700	15,800	10,300
0.005	200	33,000	24,900	18,400	12,000

06483500 ROCK RIVER NEAR ROCK VALLEY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1949 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.35	0.90	2.3	3.2
0.02	50	0.00	0.00	0.00	0.00	0.00	0.65	1.5	3.3	4.6
0.05	20	0.46	0.56	0.62	0.70	0.77	1.6	3.1	5.6	7.9
0.10	10	1.6	1.8	2.0	2.0	2.0	3.2	5.7	9.1	13
0.20	5	3.8	4.0	4.3	4.7	5.2	7.4	12	16	23
0.50	2	15	15	16	22	23	30	41	50	68
0.80	1.25	51	54	57	72	79	102	126	149	208
0.90	1.11	96	104	110	114	137	176	217	263	374
0.96	1.04	187	208	221	230	270	299	373	482	698
0.98	1.02	286	329	351	360	380	409	520	711	1,050
0.99	1.01	422	499	535	550	590	650	692	1,010	1,500

Magnitude and frequency of seasonal low discharges, based on period of record July 1948 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	8.8	11	14	18
0.02	50	0.00	0.00	0.00	0.00	12	14	18	24
0.05	20	0.33	0.33	0.33	0.79	18	22	27	36
0.10	10	1.3	1.3	1.3	2.1	28	33	40	53
0.20	5	4.4	4.4	4.4	5.6	45	54	64	86
0.50	2	18	19	25	26	120	141	163	217
0.80	1.25	64	68	83	90	324	374	430	567
0.90	1.11	122	130	140	159	553	627	723	951
0.96	1.04	237	256	270	275	984	1,100	1,270	1,670
0.98	1.02	366	370	375	380	1,440	1,580	1,850	2,410
0.99	1.01	542	596	600	650	2,020	2,190	2,600	3,370
		July-August-September				October-November-December			
0.01	100	0.78	1.4	1.8	2.6	0.75	1.2	1.6	2.2
0.02	50	1.3	2.1	2.6	3.9	1.2	1.8	2.3	3.2
0.05	20	2.8	4.0	4.8	6.9	2.3	3.2	4.1	5.7
0.10	10	5.3	6.9	8.2	11	4.0	5.4	6.7	9.4
0.20	5	11	13	15	21	7.9	10	12	17
0.50	2	40	44	49	64	27	34	40	54
0.80	1.25	126	134	150	191	88	112	132	169
0.90	1.11	216	235	263	335	157	210	246	305
0.96	1.04	369	418	474	602	286	409	480	572
0.98	1.02	511	601	687	876	416	629	740	857
0.99	1.01	674	827	954	1,220	580	926	1,090	1,230

06484000 DRY CREEK AT HAWARDEN, IOWA

LOCATION.—Lat 42°59'48", long 96°28'10", in NE1/4 NE1/4 sec. 2, T94N, R48W, Sioux County, Hydrologic Unit 10170203, on left bank 6 ft downstream from bridge on State Highway 10, at east edge of Hawarden and 2.0 mi upstream from mouth.

DRAINAGE AREA.—48.4 mi^2.

PERIOD OF RECORD.—June 1948 to September 1969 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 1,170.42 ft above mean sea level (U.S. Army Corps of Engineers benchmark). Prior to October 30, 1949, nonrecording gage at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 10,900 ft^3/s, June 7, 1958, gage height, 17.57 ft; no flow many days most years.

Selected values from rating table number 6, developed March 1969
(A discharge measurement to validate this rating has not been made since October 1969)

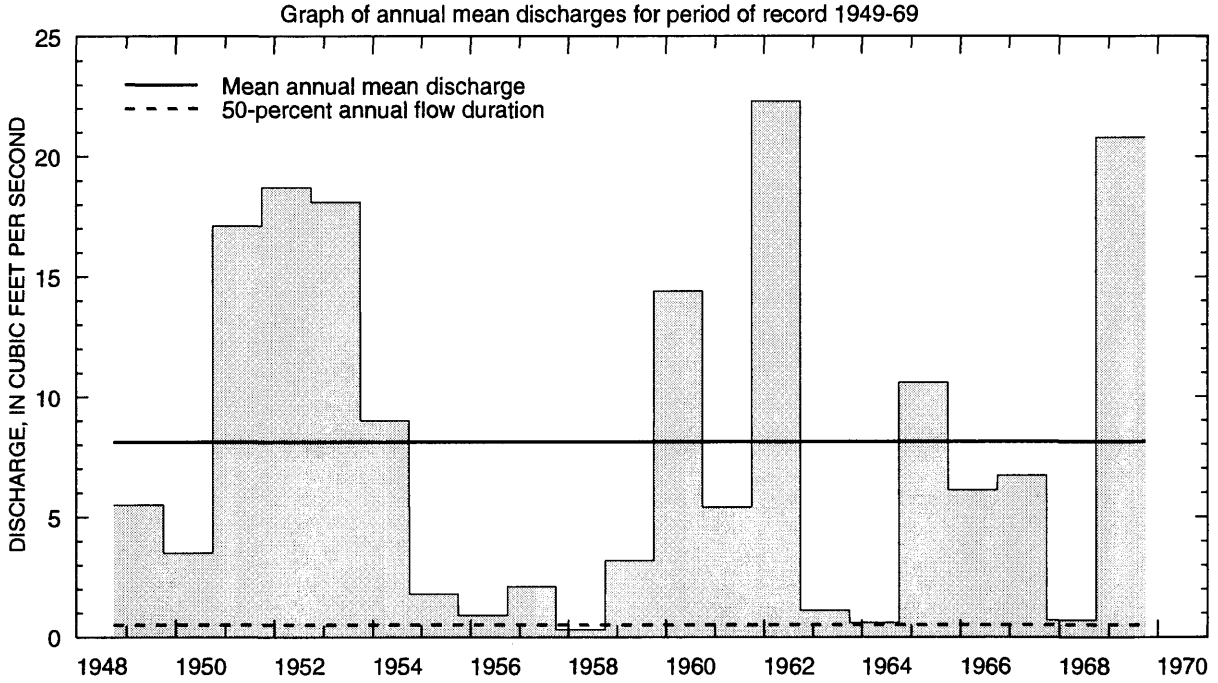
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	21	8.5	610
6.5	61	9.0	950
7.0	126	9.5	1,460
7.5	229	10.0	2,210
8.0	375	10.5	3,240

06484000 DRY CREEK AT HAWARDEN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1949-69

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	8.84	1952	0.000	1959	1.63	2.74
November	8.06	1952	0.000	1959	0.96	1.76
December	5.48	1952	0.000	1959	0.65	1.23
January	2.18	1952	0.000	1959	0.27	0.55
February	53.1	1966	0.000	1959	7.40	14.8
March	166	1962	0.23	1968	31.7	40.4
April	153	1969	0.033	1959	18.9	37.0
May	29.1	1959	0.083	1968	5.21	7.16
June	147	1953	0.007	1958	18.4	34.1
July	39.9	1951	0.000	1958	6.03	9.86
August	20.7	1952	0.000	1964	3.40	5.41
September	20.8	1951	0.000	1959	2.28	4.53
Annual	22.3	1962	0.33	1958	8.05	7.47

Graph of annual mean discharges for period of record 1949-69



06484000 DRY CREEK AT HAWARDEN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1949-69

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.10	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.12	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.10	0.60	0.20	0.10	0.10	0.00	0.00	0.00
75	0.00	0.09	0.00	0.00	0.00	0.26	0.80	0.40	0.30	0.20	0.00	0.00	0.00
70	0.00	0.10	0.00	0.00	0.00	0.40	0.90	0.50	0.43	0.20	0.10	0.00	0.10
60	0.10	0.20	0.10	0.00	0.00	0.90	1.8	0.90	1.0	0.40	0.20	0.20	0.20
50	0.20	0.30	0.12	0.00	0.00	1.7	2.4	1.5	1.7	0.70	0.30	0.30	0.50
40	0.50	0.50	0.20	0.00	0.10	3.3	3.9	2.0	2.5	1.6	0.80	0.80	1.0
30	1.3	0.80	0.45	0.10	0.40	7.0	5.5	3.1	3.6	3.0	1.6	1.3	1.8
25	1.6	1.1	0.90	0.10	1.0	10	7.1	4.2	5.5	3.7	2.0	1.9	2.3
20	1.8	1.5	1.1	0.50	2.0	18	8.8	5.2	8.2	4.6	2.3	2.4	3.1
15	2.4	1.8	1.3	0.70	4.5	25	11	7.3	11	5.9	2.9	2.7	5.0
10	3.2	2.2	1.6	1.3	12	63	17	10	16	8.1	4.7	4.4	8.4
5	7.7	3.7	2.5	1.4	33	154	42	15	43	18	11	9.5	18

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 25 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	94
0.90	1.11	151
0.80	1.25	265
0.50	2	736
0.20	5	1,920
0.10	10	3,080
0.04	25	5,010
0.02	50	6,790
0.01	100	8,870
0.005	200	11,300

Magnitude and frequency of annual high discharges, based on period of record 1949-69

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	4.3	2.1	1.2	0.71
0.95	1.05	15	7.8	4.6	2.7
0.90	1.11	28	15	8.8	5.2
0.80	1.25	58	31	18	11
0.50	2	202	115	66	38
0.20	5	608	354	193	109
0.10	10	1,020	600	315	176
0.04	25	1,700	1,010	506	278
0.02	50	2,310	1,370	670	364
0.01	100	3,000	1,790	846	455
0.005	200	3,770	2,240	1,030	551

06484000 DRY CREEK AT HAWARDEN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1949 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04
0.50	2	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.15	0.33
0.80	1.25	0.00	0.00	0.00	0.09	0.23	0.46	0.68	0.78	1.7
0.90	1.11	0.26	0.56	0.60	0.70	0.74	1.2	1.6	1.8	3.6
0.96	1.04	1.1	1.1	1.5	1.8	1.9	3.1	3.7	4.5	7.6
0.98	1.02	2.0	2.1	2.3	2.8	3.2	5.2	6.0	8.1	12
0.99	1.01	3.1	3.1	3.1	3.4	4.8	8.4	9.5	14	19

Magnitude and frequency of seasonal low discharges, based on period of record July 1948 to September 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
0.50	2	0.00	0.00	0.00	0.00	0.27	0.42	0.62	0.83
0.80	1.25	0.00	0.00	0.06	0.20	1.2	1.7	2.3	3.1
0.90	1.11	0.76	0.76	0.79	0.79	2.3	3.2	4.1	5.8
0.96	1.04	1.6	1.6	1.9	1.9	4.2	5.6	7.0	11
0.98	1.02	2.3	2.3	2.9	3.2	6.0	7.9	9.7	15
0.99	1.01	3.2	3.2	3.5	4.8	8.5	11	13	22
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.50	2	0.00	0.00	0.06	0.24	0.00	0.01	0.02	0.10
0.80	1.25	0.70	0.80	1.1	1.2	0.16	0.39	0.48	0.63
0.90	1.11	1.3	1.5	2.0	2.5	0.45	1.0	1.2	1.6
0.96	1.04	2.2	2.9	3.2	5.4	1.3	2.7	2.7	3.9
0.98	1.02	2.9	4.0	6.0	8.8	2.6	4.7	5.5	7.1
0.99	1.01	3.6	5.4	9.0	14	4.9	7.8	10	13

06485500 BIG SIOUX RIVER AT AKRON, IOWA

LOCATION.—Lat 42°50'14", long 96°33'41", in SW1/4 SE1/4 SW1/4 sec. 30, T93N, R48W, Plymouth County, Hydrologic Unit 10170203, on left bank 15 ft downstream from Iowa Highway 403 bridge, 0.5 mi northwest of Akron, and 2.9 mi upstream from Union Creek.

DRAINAGE AREA.—8,424 mi^2.

PERIOD OF RECORD.—October 1928 to September 1996.

GAGE.—Water-stage recorder and crest-stage gage. Datum of gage is 1,118.90 ft above sea level. Prior to December 3, 1934, nonrecording gage at bridge 0.5 mi downstream at same datum. From December 3, 1934, to October 31, 1985, water-stage recorder at site 0.6 mi downstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 80,800 ft^3/s, April 9, 1969, gage height, 22.99 ft; maximum gage height, 23.05 ft, May 10, 1993; minimum daily discharge, 4.0 ft^3/s, January 17, 1977.

Selected values from rating table number 20, developed March 1994

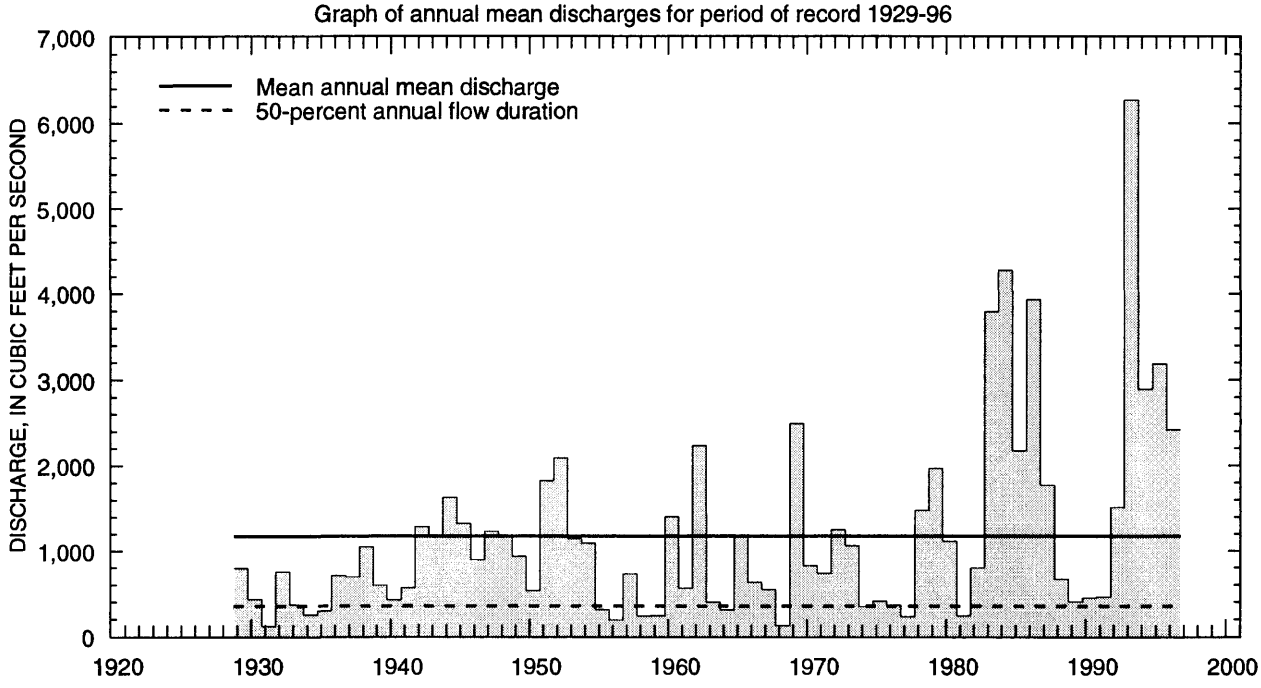
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	234	10.0	2,440
5.0	514	12.0	3,590
6.0	800	15.0	5,700
7.0	1,120	18.0	10,800
8.0	1,500	21.0	20,100

06485500 BIG SIOUX RIVER AT AKRON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1929-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	4,038	1987	32.9	1959	517	768
November	3,022	1980	47.9	1959	477	684
December	1,967	1983	32.1	1977	315	421
January	920	1996	6.68	1977	194	230
February	2,399	1966	12.1	1936	491	560
March	8,866	1983	124	1931	2,359	1,940
April	20,690	1969	139	1931	3,060	4,042
May	9,499	1993	73.3	1934	1,684	1,971
June	15,810	1984	100	1933	2,131	2,741
July	21,740	1993	50.7	1931	1,455	2,763
August	6,200	1993	45.2	1976	741	964
September	7,311	1986	36.4	1976	676	1,083
Annual	6,271	1993	120	1931	1,176	1,126

Graph of annual mean discharges for period of record 1929-96



06485500 BIG SIOUX RIVER AT AKRON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1929-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	33	40	30	6.7	11	55	132	82	73	52	34	33	27
95	47	55	40	25	25	75	204	165	124	93	54	41	50
90	67	73	54	36	40	120	309	240	195	125	83	65	70
85	84	88	65	44	55	150	404	286	252	152	102	86	90
80	104	104	75	50	63	210	508	352	313	184	129	110	110
75	116	120	89	60	70	300	604	408	394	225	157	132	135
70	133	143	100	65	77	420	688	483	483	273	180	150	163
60	185	180	125	75	100	750	911	643	658	396	245	193	234
50	223	210	155	100	130	1,150	1,190	851	899	591	348	268	352
40	279	269	180	120	190	1,590	1,500	1,120	1,250	876	487	366	552
30	367	338	224	159	360	2,320	2,320	1,690	1,800	1,220	712	517	859
25	434	431	270	180	482	2,870	2,890	2,070	2,130	1,520	870	652	1,100
20	593	553	372	240	560	3,520	3,930	2,550	2,800	1,930	1,090	795	1,420
15	848	760	600	423	800	4,720	5,260	3,050	3,760	2,480	1,360	1,090	1,920
10	1,280	1,420	900	590	1,100	6,190	8,300	3,880	5,130	3,240	1,660	1,500	2,780
5	2,300	2,000	1,330	740	2,000	8,940	12,100	6,160	8,390	4,510	2,570	2,430	4,790

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 68 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	734
0.95	1.05	1,680
0.90	1.11	2,560
0.80	1.25	4,180
0.50	2	10,100
0.20	5	22,800
0.10	10	34,000
0.04	25	50,900
0.02	50	65,400
0.01	100	81,300
0.005	200	98,700

Magnitude and frequency of annual high discharges, based on period of record 1929-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	583	470	351	260
0.95	1.05	1,360	1,090	815	609
0.90	1.11	2,080	1,670	1,240	931
0.80	1.25	3,420	2,740	2,030	1,520
0.50	2	8,260	6,570	4,840	3,550
0.20	5	18,400	14,500	10,600	7,510
0.10	10	27,100	21,100	15,400	10,700
0.04	25	40,000	30,900	22,400	15,100
0.02	50	50,800	39,000	28,200	18,700
0.01	100	62,400	47,700	34,300	22,400
0.005	200	74,900	57,000	40,900	26,100

06485500 BIG SIOUX RIVER AT AKRON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1929 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.6	6.8	7.6	8.2	9.7	16	21	26	31
0.02	50	8.6	8.8	9.8	11	12	19	25	31	37
0.05	20	13	13	14	15	18	26	33	40	50
0.10	10	18	19	20	22	25	34	44	52	65
0.20	5	28	29	31	33	39	50	62	73	94
0.50	2	67	69	72	77	88	107	131	153	203
0.80	1.25	164	168	172	182	209	254	307	359	489
0.90	1.11	263	271	277	290	332	413	501	586	811
0.96	1.04	440	453	464	480	550	716	874	1,030	1,440
0.98	1.02	616	634	652	668	767	1,040	1,280	1,510	2,130
0.99	1.01	836	861	888	902	1,040	1,470	1,820	2,160	3,060

Magnitude and frequency of seasonal low discharges, based on period of record October 1928 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	6.6	7.6	8.2	10	40	44	49	65
0.02	50	8.8	9.9	11	13	51	57	63	83
0.05	20	13	15	16	19	75	84	93	121
0.10	10	19	21	23	27	107	120	133	170
0.20	5	31	33	35	41	165	185	204	260
0.50	2	73	77	82	93	386	432	479	602
0.80	1.25	178	185	195	219	935	1,040	1,150	1,450
0.90	1.11	283	295	309	345	1,500	1,660	1,850	2,340
0.96	1.04	465	487	507	564	2,520	2,760	3,080	3,940
0.98	1.02	643	675	700	779	3,540	3,850	4,310	5,550
0.99	1.01	860	906	937	1,040	4,830	5,210	5,850	7,580
		July-August-September				October-November-December			
0.01	100	18	20	21	24	19	23	24	26
0.02	50	22	24	26	30	22	26	28	31
0.05	20	31	35	37	44	29	33	35	39
0.10	10	43	48	51	61	38	42	44	51
0.20	5	66	72	77	94	52	58	61	71
0.50	2	154	168	182	226	108	119	128	150
0.80	1.25	396	427	467	584	253	283	312	370
0.90	1.11	672	723	791	989	414	471	532	633
0.96	1.04	1,220	1,300	1,430	1,780	727	852	992	1,180
0.98	1.02	1,810	1,930	2,120	2,630	1,070	1,280	1,530	1,820
0.99	1.01	2,620	2,790	3,060	3,760	1,540	1,890	2,300	2,730

06486000 MISSOURI RIVER AT SIOUX CITY, IOWA

LOCATION.—Lat 42°29'09", long 96°24'49", in NW1/4 SE1/4 sec. 16, T29N, R9E sixth principal meridian, Dakota County, Nebraska, Hydrologic Unit 10230001, on right bank on upstream side of bridge on U.S. Highway 20 and 77 at South Sioux City, Nebraska, 1.9 mi downstream from Big Sioux River, and at mile 732.2.

DRAINAGE AREA.—314,600 mi^2 approximately. The 3,959 mi^2 in Great Divide Basin are not included.

PERIOD OF RECORD.—October 1897 to September 1996 in reports of the U.S. Geological Survey. Prior to October 1928 and October 1931 to September 1938, monthly discharges only, published in WSP 1310. January 1879 to December 1890, monthly discharges only, in House Document 238, 73rd Congress, 2d session, Missouri River.

GAGE.—Water-stage recorder. Datum of gage is 1,056.98 ft above sea level. September 2, 1878 to December 31, 1905, nonrecording gages at various locations and datums within 1.7 mi of present site. January 1, 1906 to February 14, 1935, nonrecording gage, and February 15, 1935 to September 30, 1969, water-stage recorder at site 227 ft downstream at datum 19.98 ft higher, and October 1, 1969 to September 30, 1970 at datum 20.00 ft higher. October 1, 1970 to January 30, 1981, water-stage recorder at site 227 ft downstream at present datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 101,000 ft^3/s, April 3, 1960; maximum gage height, 30.65 ft, February 19, 1971; minimum daily discharge, 3,000 ft^3/s, December 11, 1961.

REMARKS.—Flow regulated by upstream main-stem reservoirs. Significant regulation is assumed to have begun in 1953.

Selected values from rating table number 10, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
11.0	14,600	15.0	27,500
11.5	16,000	16.0	31,200
12.0	17,400	18.0	39,400
12.5	18,800	20.0	48,500
13.0	20,200	22.0	59,200
14.0	23,800	25.0	87,500

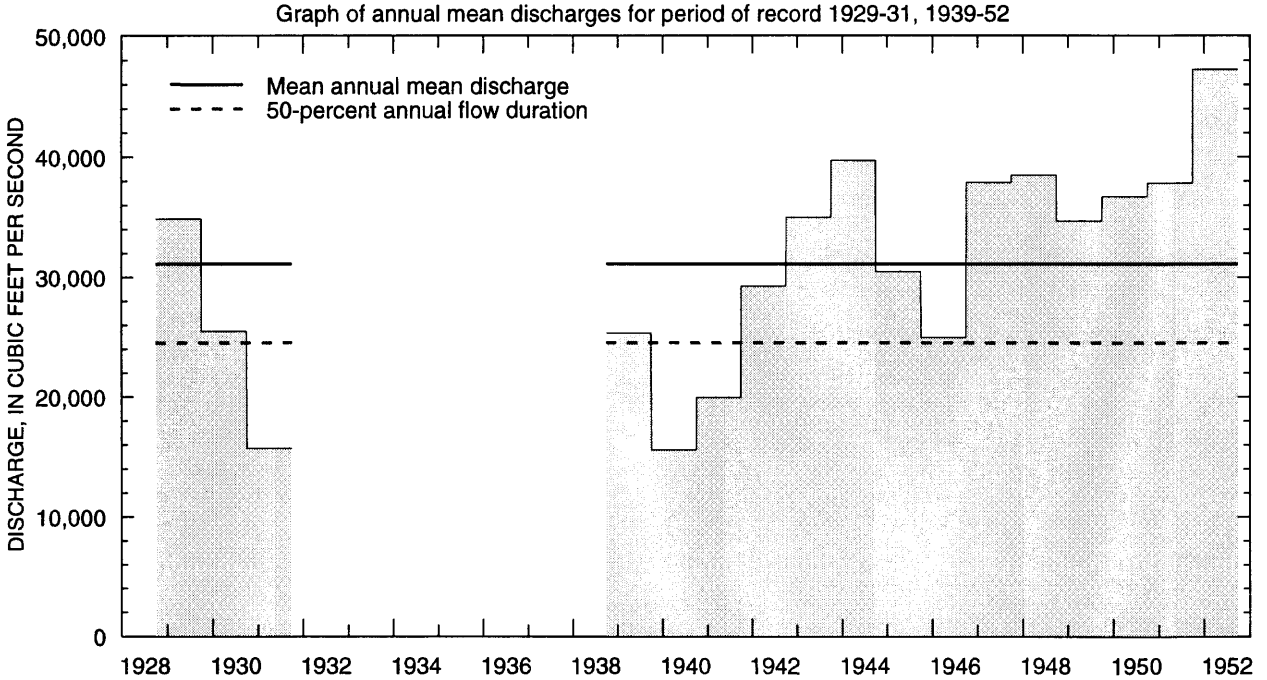
06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1929-31, 1939-52

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	45,340	1952	9,875	1940	26,020	9,846
November	38,890	1952	8,590	1941	22,350	8,196
December	17,380	1944	7,410	1947	10,430	2,805
January	16,590	1951	3,735	1940	10,730	3,380
February	26,730	1952	5,576	1940	13,770	5,446
March	58,950	1945	9,632	1940	31,030	14,350
April	186,900	1952	19,350	1931	63,860	42,130
May	76,180	1942	14,630	1931	37,170	15,850
June	110,600	1929	29,630	1940	59,220	21,530
July	81,840	1944	21,950	1931	45,090	16,990
August	45,160	1951	10,790	1931	27,930	9,350
September	49,410	1951	8,394	1931	25,810	9,967
Annual	47,250	1952	15,550	1940	31,120	8,888

Graph of annual mean discharges for period of record 1929-31, 1939-52



06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1929-31, 1939-52

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8,960	4,500	3,260	3,130	5,400	6,430	14,100	12,700	20,600	13,100	9,340	7,550	4,500
95	10,300	7,440	4,300	4,340	5,610	8,340	18,600	15,400	25,200	19,100	13,000	8,620	7,200
90	13,700	10,400	5,510	6,400	6,900	11,700	20,300	17,400	29,300	21,800	15,400	11,200	8,700
85	15,900	12,100	6,000	7,000	7,820	14,000	22,000	20,500	32,500	25,500	17,600	13,500	10,400
80	16,500	14,000	6,600	7,400	8,700	15,000	24,500	21,500	35,200	28,700	19,100	15,300	12,300
75	17,400	15,100	7,000	8,000	9,330	16,000	26,500	23,100	38,100	31,000	20,600	18,700	14,400
70	20,100	16,600	7,440	8,380	10,000	16,700	30,600	26,500	41,100	33,000	21,700	21,200	16,000
60	22,500	18,500	8,200	8,900	11,500	18,400	37,600	31,300	46,000	37,100	24,400	24,000	19,800
50	25,500	20,400	9,200	10,300	12,300	20,700	43,100	34,100	51,800	40,600	27,200	27,300	24,500
40	27,700	24,200	10,200	11,500	14,400	25,300	53,100	37,400	58,300	45,700	30,200	29,300	29,300
30	30,600	26,800	11,600	13,300	16,000	34,600	69,000	41,600	68,300	51,600	32,700	30,300	34,900
25	33,400	28,700	12,300	13,800	17,000	40,500	75,400	44,300	73,700	55,600	34,400	30,900	38,700
20	36,100	30,300	13,400	14,400	18,000	44,800	90,000	48,500	81,000	60,000	36,900	31,600	42,500
15	37,400	33,000	14,700	15,100	20,000	53,300	109K	53,600	88,100	64,600	38,600	33,000	48,500
10	39,600	38,200	17,400	16,400	21,900	65,000	145K	62,000	97,400	71,000	41,100	37,400	59,900
5	44,000	42,200	21,000	17,800	26,000	85,400	175K	71,900	120K	87,200	45,700	43,000	80,000

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 24 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	41,300
0.95	1.05	61,200
0.90	1.11	74,500
0.80	1.25	93,400
0.50	2	139,000
0.20	5	198,000
0.10	10	233,000
0.04	25	275,000
0.02	50	304,000
0.01	100	332,000
0.005	200	357,000

Magnitude and frequency of annual high discharges, based on period of record 1929-31, 1939-52

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	34,600	29,700	28,200	25,000
0.95	1.05	51,700	45,500	41,000	35,400
0.90	1.11	63,700	56,600	49,800	42,400
0.80	1.25	81,800	73,200	62,600	52,300
0.50	2	130,000	117,000	95,700	77,100
0.20	5	197,000	182,000	143,000	111,000
0.10	10	232,000	227,000	175,000	133,000
0.04	25	274,000	273,000	216,000	161,000
0.02	50	303,000	302,000	247,000	181,000
0.01	100	331,000	330,000	277,000	200,000
0.005	200	356,000	355,000	308,000	220,000

06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1929 to March 1931, April 1939 to March 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2,250	2,390	2,730	3,040	3,430	3,980	4,750	5,740	6,370
0.02	50	2,400	2,550	2,910	3,280	3,790	4,460	5,240	6,360	7,330
0.05	20	2,670	2,840	3,230	3,690	4,390	5,270	6,060	7,380	8,930
0.10	10	2,960	3,150	3,570	4,110	4,990	6,060	6,890	8,380	10,500
0.20	5	3,420	3,630	4,090	4,710	5,810	7,130	8,020	9,730	12,700
0.50	2	4,730	4,980	5,500	6,260	7,700	9,470	10,600	12,800	17,300
0.80	1.25	7,040	7,290	7,790	8,540	10,100	12,200	14,000	16,400	22,400
0.90	1.11	8,940	9,150	9,560	10,200	11,600	13,700	16,100	18,500	25,100
0.96	1.04	11,800	11,900	12,100	12,300	13,300	15,500	18,600	21,000	28,000
0.98	1.02	14,000	14,000	14,000	14,000	14,600	16,600	20,400	22,600	29,900
0.99	1.01	15,800	15,800	15,800	15,800	15,800	17,700	22,100	24,200	31,500

Magnitude and frequency of seasonal low discharges, based on period of record October 1928 to September 1931, October 1938 to September 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2,830	2,830	2,900	3,240	9,640	9,900	10,700	11,200
0.02	50	3,250	3,290	3,430	3,860	10,900	11,200	12,000	12,900
0.05	20	3,920	4,080	4,340	4,930	13,000	13,400	14,300	15,700
0.10	10	4,600	4,870	5,240	6,000	15,000	15,600	16,600	18,500
0.20	5	5,520	5,930	6,450	7,400	17,900	18,700	19,700	22,300
0.50	2	7,560	8,230	8,990	10,300	24,500	25,900	27,200	30,900
0.80	1.25	9,950	10,700	11,600	13,100	32,700	35,000	36,700	40,900
0.90	1.11	11,300	12,100	12,800	14,400	37,700	40,700	42,600	46,600
0.96	1.04	12,800	13,500	14,100	15,600	43,500	47,400	49,700	53,000
0.98	1.02	13,800	14,300	14,800	16,200	47,500	52,100	54,700	57,200
0.99	1.01	14,700	15,100	15,300	16,700	51,300	56,600	59,500	61,000
		July-August-September				October-November-December			
0.01	100	4,910	5,110	5,390	6,360	2,290	3,090	4,050	5,770
0.02	50	5,970	6,220	6,590	7,730	2,490	3,300	4,270	6,030
0.05	20	7,890	8,210	8,730	10,200	2,850	3,680	4,650	6,490
0.10	10	9,920	10,300	11,000	12,700	3,230	4,070	5,050	6,960
0.20	5	12,800	13,300	14,200	16,100	3,780	4,640	5,610	7,650
0.50	2	19,700	20,400	21,400	23,700	5,250	6,090	7,020	9,400
0.80	1.25	27,900	28,900	29,700	31,800	7,530	8,230	9,050	12,000
0.90	1.11	32,600	33,600	34,100	35,800	9,220	9,770	10,500	13,800
0.96	1.04	37,600	38,700	38,700	39,800	11,600	11,800	12,300	16,200
0.98	1.02	40,900	41,000	41,500	42,100	13,500	13,500	13,800	18,200
0.99	1.01	43,700	43,800	43,900	44,000	15,000	15,200	15,300	20,200

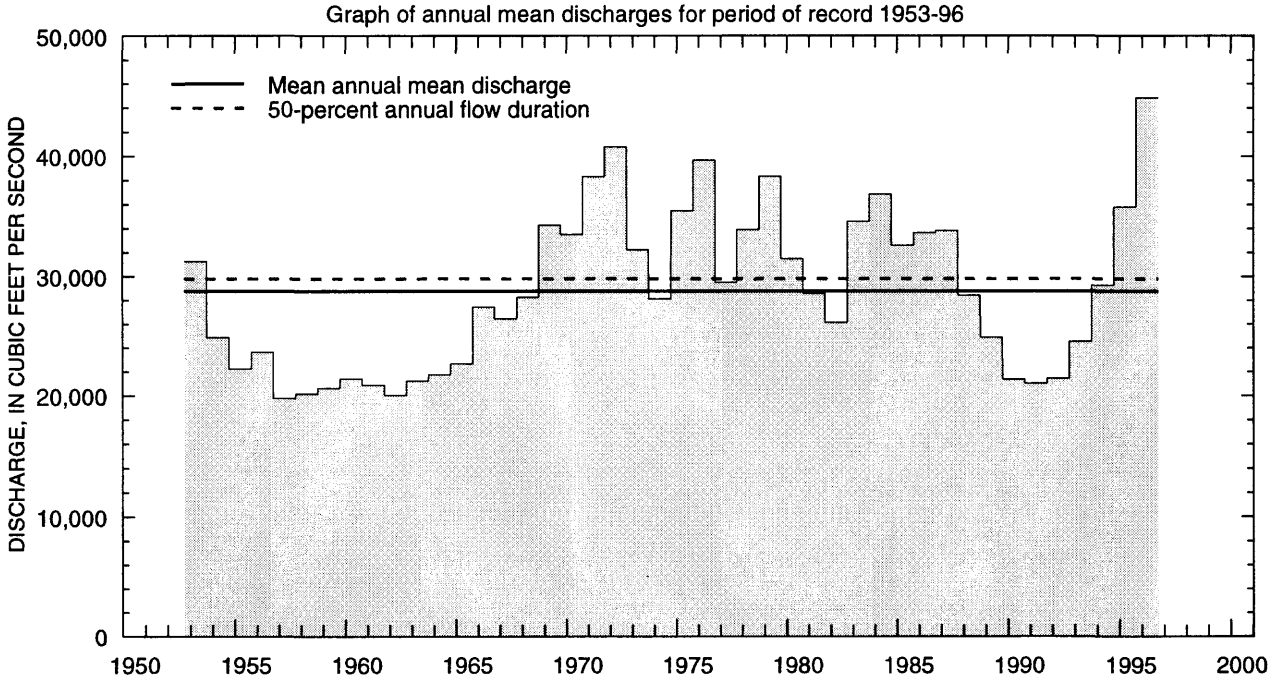
06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1953-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	63,260	1976	14,350	1962	34,990	9,970
November	62,930	1976	6,951	1962	29,330	14,640
December	36,770	1987	8,271	1962	17,850	7,891
January	27,720	1987	7,316	1964	15,390	5,137
February	27,730	1983	6,293	1963	16,490	5,914
March	38,290	1953	9,135	1957	22,520	7,950
April	50,970	1969	17,450	1957	32,160	6,738
May	46,250	1986	23,820	1962	32,910	6,455
June	65,070	1953	23,270	1960	35,000	8,985
July	55,000	1996	26,890	1958	35,680	7,669
August	63,090	1975	24,270	1993	36,210	9,245
September	63,290	1975	25,790	1962	36,190	9,349
Annual	44,840	1996	19,770	1957	28,770	6,695

Graph of annual mean discharges for period of record 1953-96



06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1953-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	7,860	6,820	6,500	6,400	6,200	5,940	10,000	21,100	21,300	23,400	21,400	25,000	7,200
95	24,500	8,500	8,000	8,000	7,600	8,500	23,100	24,200	24,200	26,200	25,900	26,200	9,000
90	26,100	9,690	8,560	8,600	8,200	9,340	24,200	25,300	25,800	27,600	27,800	27,400	11,100
85	27,600	10,500	9,120	9,000	8,900	10,500	25,000	26,400	27,100	28,400	28,800	28,400	14,500
80	28,800	11,600	9,550	9,500	9,600	11,700	25,800	27,300	27,800	29,200	29,800	29,400	17,500
75	29,700	14,500	10,500	10,500	11,000	14,000	26,800	28,000	28,600	30,200	30,600	30,200	19,700
70	30,200	17,500	12,000	11,500	12,100	15,600	28,000	28,900	29,400	30,900	31,200	30,900	23,200
60	31,300	27,100	14,000	13,800	15,000	18,300	29,900	30,400	30,900	31,900	32,000	31,700	27,100
50	32,200	30,800	17,300	15,100	17,300	21,200	31,100	31,600	31,800	33,100	32,700	32,700	29,800
40	33,900	32,900	18,500	17,000	18,300	24,800	32,100	32,300	33,300	34,700	34,200	34,200	31,500
30	36,700	36,400	19,800	18,200	19,600	29,200	33,500	33,400	37,200	37,900	37,700	36,800	33,100
25	38,200	38,500	21,200	19,000	20,300	31,000	34,900	35,200	39,100	39,500	39,200	39,500	34,300
20	41,800	41,200	23,900	20,100	21,300	32,300	37,000	37,800	41,600	41,500	44,300	43,300	37,000
15	46,800	46,000	26,000	21,100	23,400	33,600	39,400	40,200	44,300	44,100	48,600	48,900	39,700
10	50,500	51,500	29,100	23,000	24,400	36,000	41,900	44,000	46,600	48,900	52,200	52,700	44,600
5	56,800	56,300	36,100	24,600	26,900	39,400	46,100	48,000	52,400	53,600	55,400	56,100	50,800

Magnitude and frequency of instantaneous peak discharges[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	--
0.50	2	44,000
0.20	5	--
0.10	10	62,000
0.04	25	--
0.02	50	104,000
0.01	100	124,000
0.005	200	--

Magnitude and frequency of annual high discharges, based on period of record 1953-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	25,600	25,300	25,100	24,600
0.95	1.05	29,200	28,900	28,700	28,000
0.90	1.11	31,700	31,400	31,000	30,200
0.80	1.25	35,400	34,900	34,400	33,300
0.50	2	45,300	44,100	42,700	40,800
0.20	5	60,700	58,000	54,800	51,100
0.10	10	72,300	67,900	63,100	58,100
0.04	25	88,500	81,500	74,200	67,000
0.02	50	102,000	92,400	82,800	73,800
0.01	100	116,000	104,000	91,700	80,700
0.005	200	132,000	116,000	101,000	87,800

[a] *Final Report, Missouri River Flood Plain Study,* Missouri Basin States Association, May 1983. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

06486000 MISSOURI RIVER AT SIOUX CITY, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1953 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2,800	4,020	4,420	4,540	4,830	5,240	5,520	5,730	9,340
0.02	50	3,240	4,500	4,980	5,170	5,510	5,970	6,290	6,540	10,300
0.05	20	4,020	5,330	5,960	6,260	6,690	7,210	7,590	7,940	12,000
0.10	10	4,850	6,200	6,970	7,380	7,890	8,470	8,920	9,380	13,700
0.20	5	6,060	7,430	8,390	8,940	9,580	10,200	10,800	11,400	16,000
0.50	2	9,150	10,500	11,800	12,700	13,600	14,300	15,100	16,300	21,500
0.80	1.25	13,600	14,900	16,500	17,500	18,600	19,500	20,600	22,700	28,800
0.90	1.11	16,500	17,800	19,500	20,500	21,800	22,600	24,000	26,800	33,500
0.96	1.04	20,300	21,600	23,300	24,100	25,500	26,300	28,000	31,700	39,200
0.98	1.02	23,200	24,500	26,000	26,700	28,100	28,900	30,800	35,200	43,400
0.99	1.01	26,000	27,300	28,700	29,200	30,600	31,300	33,400	38,600	47,600

Magnitude and frequency of seasonal low discharges, based on period of record
October 1952 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4,070	4,490	4,690	5,100	10,100	11,200	11,800	19,000
0.02	50	4,510	5,110	5,380	5,830	11,800	13,200	13,900	20,000
0.05	20	5,250	6,180	6,540	7,080	14,500	16,300	17,300	21,700
0.10	10	6,030	7,270	7,730	8,350	17,100	19,200	20,400	23,300
0.20	5	7,140	8,790	9,370	10,100	20,400	22,800	24,100	25,300
0.50	2	9,970	12,400	13,200	14,100	26,600	28,900	30,200	30,300
0.80	1.25	14,100	17,000	17,900	19,000	31,900	33,400	34,100	34,600
0.90	1.11	16,900	19,900	20,700	21,900	34,000	34,900	35,300	37,400
0.96	1.04	20,700	23,300	24,000	25,200	35,900	35,900	36,000	40,600
0.98	1.02	23,600	25,700	26,200	27,500	36,800	36,900	37,000	42,800
0.99	1.01	26,600	28,000	28,300	29,600	37,500	38,000	40,000	44,800
		July-August-September				October-November-December			
0.01	100	10,100	14,900	20,300	22,900	2,560	4,690	5,060	5,230
0.02	50	12,300	16,600	21,200	23,500	3,150	5,310	5,720	5,940
0.05	20	15,900	19,300	22,700	24,600	4,240	6,410	6,860	7,190
0.10	10	19,400	21,900	24,200	25,800	5,450	7,570	8,060	8,520
0.20	5	23,700	25,100	26,300	27,600	7,280	9,250	9,800	10,500
0.50	2	31,100	31,500	31,700	32,100	12,100	13,500	14,200	15,500
0.80	1.25	36,300	37,700	37,900	39,000	18,800	19,800	20,400	23,100
0.90	1.11	37,800	40,700	42,300	43,800	23,200	24,100	24,700	28,400
0.96	1.04	38,800	43,700	47,900	50,400	28,600	29,600	30,200	35,400
0.98	1.02	39,200	45,500	52,100	55,500	32,400	33,900	34,400	40,900
0.99	1.01	39,400	46,900	56,300	60,900	36,000	38,200	38,700	46,500

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06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA

LOCATION.—Lat 42°32'08", long 96°24'39", in SE1/4 SE1/4 sec. 8, T89N, R47W, Woodbury County, Hydrologic Unit 10230001, on left bank at downstream side of bridge on 38th Street in Sioux City, 1.9 mi downstream from West Branch, and 4.2 mi upstream from mouth.

DRAINAGE AREA.—65.1 mi^2.

PERIOD OF RECORD.—October 1945 to September 1969, June 1981 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,112.04 ft above sea level (City of Sioux City benchmark). Prior to May 20, 1954, nonrecording gage with supplementary water-stage recorder in operation above 5.0 ft gage height and May 20, 1954 to September 30, 1969, water-stage recorder at present site at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,670 ft^3/s, May 19, 1990, gage height, 28.54 ft, from rating curve extended above 1,700 ft^3/s on basis of slope-area measurement of peak flow; no flow July 14, 20, 1946, August 30–September 2, 1946, many days in August–October 1958 and August–September 1959, July 26–30, 1960.

Selected values from rating table number 10, developed October 1994

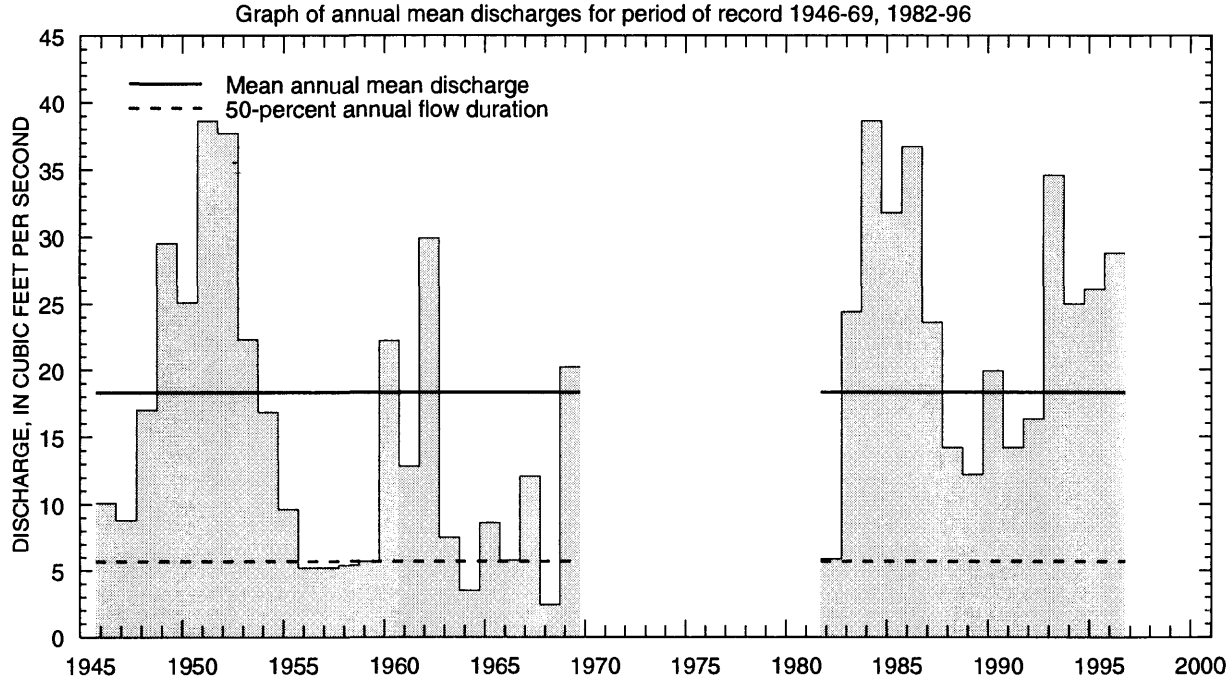
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	2.7	12.0	1,080
7.0	51.7	16.0	2,660
8.0	170	20.0	4,290
9.0	326	25.0	6,650
10.0	531	30.5	9,600

06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1946-69, 1982-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	29.5	1993	0.38	1959	7.69	7.41
November	26.3	1993	0.81	1982	7.12	6.85
December	19.4	1993	0.48	1959	6.00	5.79
January	47.5	1952	0.33	1982	6.43	8.82
February	78.4	1948	1.31	1959	19.0	19.5
March	188	1962	2.62	1964	45.1	43.8
April	123	1985	2.30	1959	24.9	29.1
May	140	1990	2.91	1968	23.3	24.8
June	125	1984	0.94	1956	31.8	30.0
July	99.6	1952	0.35	1946	21.9	23.6
August	85.5	1951	0.30	1965	13.4	17.5
September	147	1949	0.083	1958	13.2	25.5
Annual	38.6	1984	2.38	1968	18.3	11.1

Graph of annual mean discharges for period of record 1946-69, 1982-96



06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1946-69, 1982-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.47	0.30	0.30	0.20	0.50	1.2	0.80	0.40	0.10	0.00	0.00	0.17
95	0.40	0.89	0.60	0.50	0.80	2.2	2.1	1.7	1.0	0.30	0.20	0.10	0.50
90	0.60	1.1	0.90	0.70	1.0	3.2	3.2	2.2	1.3	0.60	0.30	0.30	0.90
85	0.80	1.3	1.0	0.95	1.4	4.0	4.0	2.7	1.9	0.90	0.40	0.50	1.2
80	1.0	1.5	1.2	1.1	1.7	4.8	4.5	3.3	2.5	1.4	0.60	0.86	1.6
75	1.4	1.8	1.4	1.3	2.0	5.9	5.0	3.8	3.1	1.8	0.90	1.0	2.0
70	1.8	2.2	1.7	1.6	2.2	7.0	5.7	4.5	3.5	2.3	1.4	1.2	2.6
60	3.1	3.1	2.3	2.0	3.6	10	7.0	6.4	5.1	4.0	2.9	2.4	4.0
50	4.4	4.2	3.1	2.8	5.4	14	10	9.4	9.8	6.7	4.6	3.7	5.7
40	6.2	5.4	4.5	4.5	9.4	19	15	15	15	10	7.2	5.4	8.5
30	8.0	7.2	7.0	7.0	12	26	20	19	20	15	10	8.7	13
25	10	11	8.4	8.0	14	30	24	23	23	18	12	11	15
20	12	13	10	9.0	17	38	29	28	27	21	14	12	18
15	16	16	13	10	25	50	35	33	35	26	17	15	22
10	19	18	16	13	40	89	43	42	52	36	21	19	30
5	25	22	18	16	70	200	66	64	101	56	29	27	50

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 48 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	242
0.95	1.05	527
0.90	1.11	772
0.80	1.25	1,190
0.50	2	2,460
0.20	5	4,540
0.10	10	5,990
0.04	25	7,810
0.02	50	9,110
0.01	100	10,400
0.005	200	11,600

Magnitude and frequency of annual high discharges, based on period of record 1946-69, 1982-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	33	16	9.2	6.6
0.95	1.05	71	36	22	15
0.90	1.11	104	54	33	23
0.80	1.25	160	86	52	35
0.50	2	334	186	111	72
0.20	5	622	353	202	128
0.10	10	826	469	262	163
0.04	25	1,090	615	332	204
0.02	50	1,270	719	379	231
0.01	100	1,460	817	422	256
0.005	200	1,630	911	461	278

06600000 PERRY CREEK AT 38TH STREET, SIOUX CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1969, April 1982 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.04	0.08	0.20	0.28	0.39
0.02	50	0.00	0.00	0.00	0.00	0.06	0.13	0.28	0.39	0.53
0.05	20	0.00	0.00	0.00	0.04	0.13	0.25	0.46	0.61	0.83
0.10	10	0.00	0.00	0.07	0.11	0.25	0.43	0.71	0.92	1.2
0.20	5	0.16	0.18	0.22	0.31	0.51	0.81	1.2	1.5	2.0
0.50	2	0.92	1.0	1.2	1.5	1.9	2.5	3.1	3.7	4.7
0.80	1.25	3.6	4.0	4.5	5.2	6.0	7.1	8.0	8.9	11
0.90	1.11	7.0	7.6	8.4	9.1	10	12	13	14	17
0.96	1.04	13	14	16	17	18	19	21	22	27
0.98	1.02	20	22	23	24	26	26	28	30	36
0.99	1.01	29	31	32	33	34	34	38	40	47

Magnitude and frequency of seasonal low discharges, based on period of record October 1945 to September 1969, July 1981 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.10	0.12	0.15	0.22	0.14	0.23	0.36	0.69
0.02	50	0.15	0.17	0.22	0.30	0.21	0.33	0.49	0.90
0.05	20	0.25	0.29	0.36	0.47	0.38	0.55	0.78	1.3
0.10	10	0.39	0.45	0.56	0.70	0.62	0.87	1.2	1.9
0.20	5	0.66	0.76	0.93	1.1	1.1	1.5	1.9	2.9
0.50	2	1.8	2.1	2.4	2.9	3.4	4.2	5.0	6.8
0.80	1.25	4.8	5.4	6.0	7.6	9.8	11	13	16
0.90	1.11	7.9	8.8	9.4	13	17	19	21	25
0.96	1.04	13	15	15	22	30	32	34	42
0.98	1.02	18	20	21	31	42	45	48	57
0.99	1.01	25	27	29	43	58	61	64	77
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.03	0.00	0.04	0.11	0.28
0.02	50	0.00	0.00	0.00	0.06	0.00	0.07	0.16	0.37
0.05	20	0.00	0.00	0.05	0.15	0.10	0.15	0.28	0.57
0.10	10	0.00	0.08	0.15	0.31	0.20	0.28	0.45	0.83
0.20	5	0.20	0.28	0.40	0.70	0.41	0.59	0.81	1.3
0.50	2	1.4	1.6	1.9	2.9	1.4	2.0	2.3	3.2
0.80	1.25	5.7	6.4	7.1	10	4.2	5.9	6.5	7.9
0.90	1.11	11	12	13	18	7.5	9.5	11	13
0.96	1.04	21	22	23	31	14	15	18	21
0.98	1.02	30	31	32	43	20	20	26	30
0.99	1.01	43	43	43	57	25	25	34	40

06600100 FLOYD RIVER AT ALTON, IOWA

LOCATION.—Lat 42°58'55", long 96°00'03", in NE1/4 NE1/4 sec. 11, T94N, R44W, Sioux County, Hydrologic Unit 10230002, on left bank 270 ft downstream from South County Road at east edge of Alton, 34.3 mi upstream from West Branch Floyd River, and at mile 58.1.

DRAINAGE AREA.—268 mi^2.

PERIOD OF RECORD.—October 1955 to September 1996. Prior to December 1955, monthly discharge only, published in WSP 1730.

GAGE.—Water-stage recorder. Datum of gage is 1,269.55 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 16,300 ft^3/s, June 20, 1983, gage height, 18.54 ft, from flood mark and rating curve extended above 8,500 ft^3/s; no flow many days October–November 1956 and August 1958–January 1959, July 29–August 1, 1959, February 1–5, 1965, September 2, 1968, February 15–21, 1977.

Selected values from rating table number 12, developed September 1994

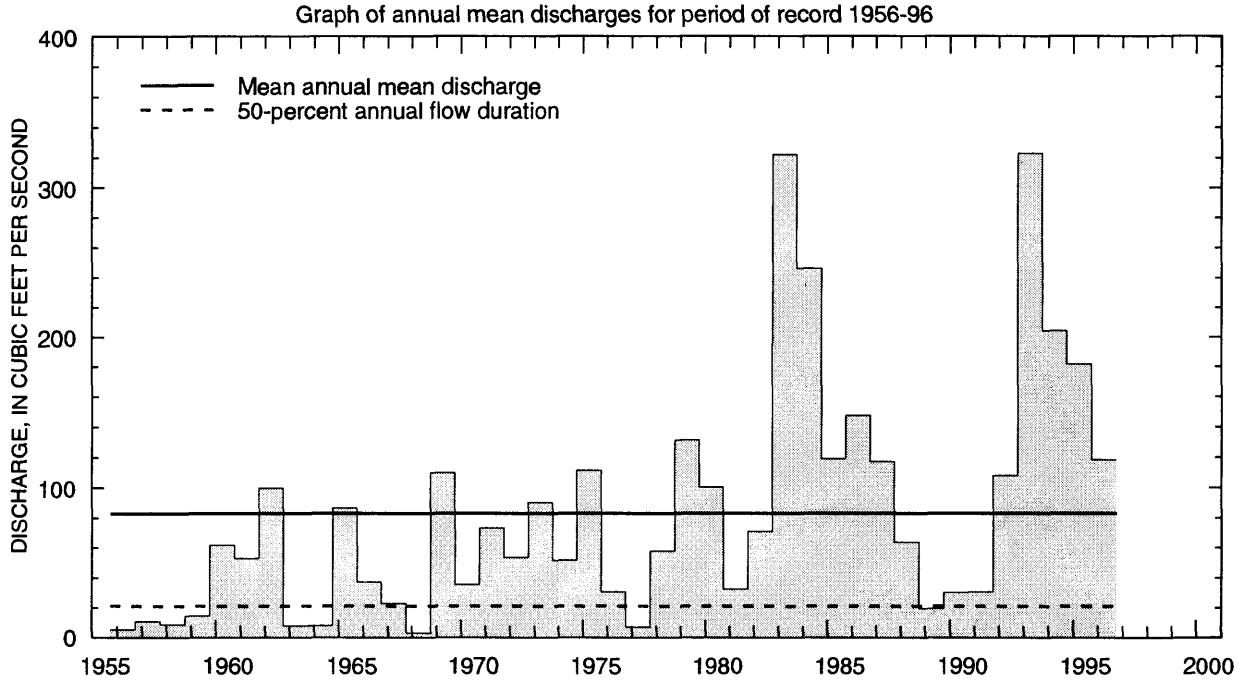
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.5	10.0	10.0	957
6.0	55.1	12.0	1,560
7.0	251	14.0	2,260
8.0	454	16.0	3,600
9.0	691	18.5	10,600

06600100 FLOYD RIVER AT ALTON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1956-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	234	1993	0.058	1957	45.0	64.1
November	287	1980	0.30	1959	42.5	62.4
December	128	1983	0.074	1959	28.0	35.6
January	109	1973	0.048	1959	18.5	27.4
February	252	1971	0.15	1977	45.9	66.0
March	605	1979	1.77	1959	170	177
April	906	1969	3.67	1959	178	216
May	454	1995	2.92	1968	114	119
June	973	1984	2.36	1968	185	251
July	878	1993	3.29	1958	90.9	152
August	369	1995	0.37	1968	47.2	70.2
September	175	1993	0.080	1958	32.6	42.2
Annual	323	1993	2.66	1968	83.1	79.3

Graph of annual mean discharges for period of record 1956-96



06600100 FLOYD RIVER AT ALTON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1956-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.20	0.10	0.00	0.00	0.17	2.1	2.1	0.60	0.40	0.03	0.02	0.10
95	0.30	1.2	0.40	0.20	0.20	1.0	5.0	3.5	2.3	1.5	0.76	0.20	0.50
90	0.90	1.7	0.97	0.40	0.20	2.2	7.0	5.8	4.2	2.7	1.6	0.90	1.3
85	2.1	2.3	1.4	0.50	0.30	3.5	9.5	9.2	9.2	4.7	2.6	1.4	2.2
80	3.0	3.0	2.2	0.80	0.50	5.3	14	14	16	6.9	3.1	2.0	3.0
75	4.4	4.8	2.7	1.1	1.0	9.9	22	19	24	9.4	3.8	2.9	4.5
70	6.1	6.3	3.5	1.3	1.4	13	28	25	31	12	5.3	3.9	6.4
60	8.5	9.0	5.6	2.3	2.4	26	51	39	44	20	8.6	7.2	12
50	13	15	9.0	4.0	4.8	40	68	57	64	30	16	13	21
40	17	20	15	6.8	16	62	98	86	94	45	22	20	36
30	42	38	27	19	28	106	141	116	128	72	37	29	57
25	50	47	39	26	35	138	172	145	158	91	48	37	75
20	62	76	50	36	44	174	220	194	197	117	63	50	100
15	116	102	66	44	60	226	299	235	270	160	84	69	131
10	149	131	90	52	90	378	383	283	420	206	120	103	184
5	194	159	112	77	192	714	642	370	783	340	181	137	309

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 47 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	81
0.95	1.05	216
0.90	1.11	356
0.80	1.25	642
0.50	2	1,880
0.20	5	5,140
0.10	10	8,470
0.04	25	14,100
0.02	50	19,500
0.01	100	25,800
0.005	200	33,200

Magnitude and frequency of annual high discharges, based on period of record 1956-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	25	16	11	6.1
0.95	1.05	88	56	36	22
0.90	1.11	161	101	65	42
0.80	1.25	315	196	125	82
0.50	2	959	595	377	251
0.20	5	2,360	1,470	932	600
0.10	10	3,510	2,200	1,390	868
0.04	25	5,060	3,200	2,020	1,210
0.02	50	6,230	3,960	2,500	1,460
0.01	100	7,380	4,730	2,990	1,690
0.005	200	8,490	5,480	3,460	1,910

06600100 FLOYD RIVER AT ALTON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1956 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.01	0.04	0.09	0.15	0.15
0.02	50	0.00	0.00	0.00	0.00	0.03	0.08	0.16	0.25	0.27
0.05	20	0.00	0.00	0.00	0.02	0.08	0.18	0.35	0.53	0.63
0.10	10	0.00	0.00	0.02	0.07	0.18	0.37	0.70	1.0	1.3
0.20	5	0.10	0.12	0.17	0.27	0.48	0.87	1.6	2.2	2.9
0.50	2	1.7	1.8	1.8	2.1	2.8	4.2	6.7	8.8	12
0.80	1.25	9.0	9.7	11	12	14	18	26	32	45
0.90	1.11	19	21	25	28	31	38	50	60	82
0.96	1.04	38	43	55	63	68	82	98	115	148
0.98	1.02	58	68	91	103	112	132	148	172	213
0.99	1.01	85	103	140	160	172	202	213	244	290

Magnitude and frequency of seasonal low discharges, based on period of record October 1955 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.02	0.07	0.16	0.31	0.69
0.02	50	0.00	0.00	0.00	0.04	0.16	0.32	0.58	1.2
0.05	20	0.00	0.00	0.04	0.10	0.50	0.87	1.4	2.5
0.10	10	0.04	0.07	0.12	0.23	1.3	2.0	2.9	4.8
0.20	5	0.23	0.28	0.37	0.57	3.6	5.1	6.6	10
0.50	2	2.1	2.2	2.5	3.2	19	24	27	37
0.80	1.25	12	13	14	17	74	84	91	115
0.90	1.11	28	33	35	39	131	146	157	196
0.96	1.04	66	80	89	96	220	244	266	334
0.98	1.02	113	140	161	169	294	328	362	459
0.99	1.01	181	231	274	279	371	418	469	603
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.02	0.06	0.00	0.00	0.02	0.04
0.02	50	0.00	0.02	0.04	0.12	0.00	0.00	0.04	0.09
0.05	20	0.00	0.08	0.13	0.31	0.01	0.03	0.13	0.26
0.10	10	0.13	0.22	0.35	0.72	0.22	0.35	0.35	0.65
0.20	5	0.58	0.72	1.0	1.8	0.69	0.96	1.1	1.8
0.50	2	3.8	4.9	6.0	8.7	3.9	4.9	6.5	9.6
0.80	1.25	18	23	25	33	17	22	29	37
0.90	1.11	38	43	48	60	35	47	55	67
0.96	1.04	77	78	87	108	73	80	99	116
0.98	1.02	108	109	122	151	115	120	139	158
0.99	1.01	140	142	161	200	174	179	182	203

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA

LOCATION.—Lat 42°55'26", long 96°10'36", in SE1/4 SE1/4 sec. 29, T94N, R45W, Sioux County, Hydrologic Unit 10230002, on left bank near wingwall at upstream side of bridge on County Highway B62, 0.1 mi west of U.S. Highway 75, 0.8 mi downstream from Orange City slough, 2.2 mi northeast of Struble, 21.4 mi upstream from Floyd River, and at mile 45.2 upstream from mouth of Floyd River.

DRAINAGE AREA.—180 mi^2.

PERIOD OF RECORD.—October 1955 to March 1995 (discontinued). Prior to December 1955, monthly discharge only, published in WSP 1730.

GAGE.—Water-stage recorder. Datum of gage is 1,239.40 ft above sea level (State Highway Commission bench mark). Prior to January 5, 1978, at site 721 ft right at old channel at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,920 ft^3/s, March 4, 1994, gage height, 15.86 ft; also maximum gage height, 15.86 ft, March 4, 1994; no flow at times many years.

Selected values from rating table number 17, developed October 1993
(A discharge measurement to validate this rating has not been made since March 1995)

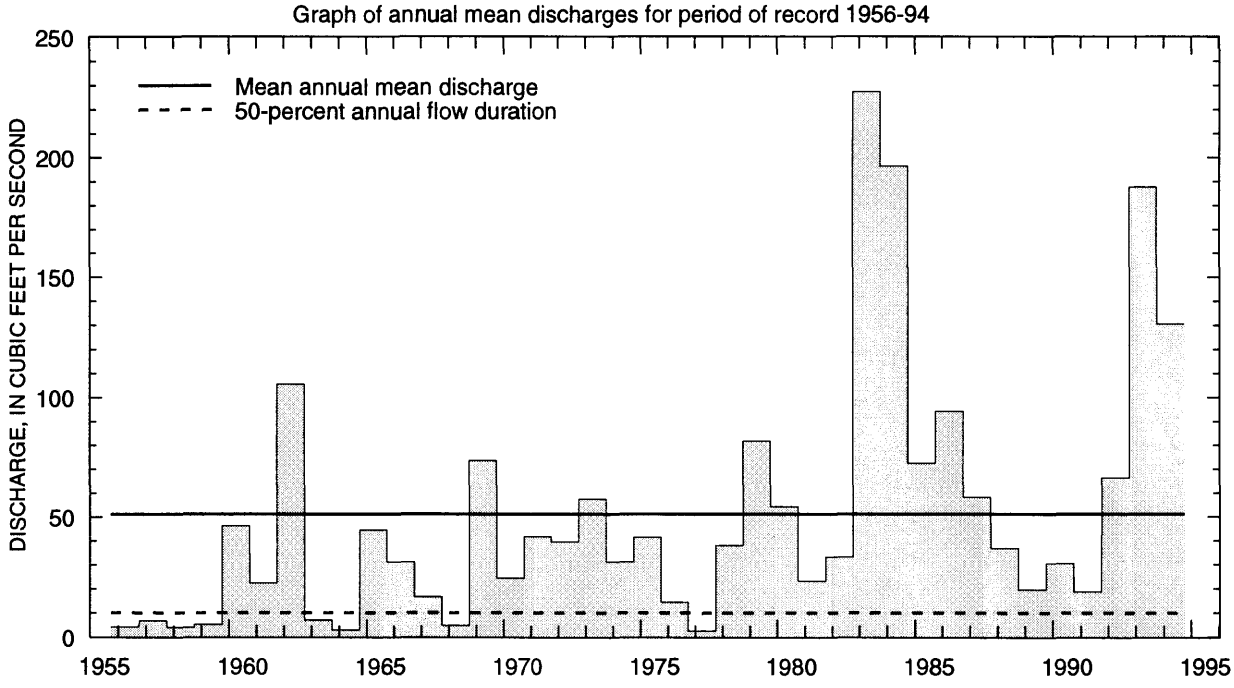
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	7.60	8.0	576
4.0	65.3	10.0	1,070
5.0	156	12.0	1,860
6.0	270	14.0	3,210
7.0	410	15.5	6,600

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1956-94

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	151	1993	0.22	1959	22.9	33.3
November	133	1980	0.35	1959	21.6	33.2
December	76.4	1984	0.048	1965	15.5	22.9
January	53.1	1983	0.000	1967	11.7	17.7
February	302	1994	0.000	1964	44.3	79.1
March	734	1962	1.26	1968	131	169
April	637	1969	1.21	1959	103	148
May	314	1984	1.00	1968	64.4	76.2
June	669	1983	0.82	1977	104	143
July	379	1993	0.89	1958	53.3	73.7
August	124	1993	0.24	1958	23.4	28.1
September	106	1993	0.17	1958	19.7	24.7
Annual	227	1983	2.49	1977	51.2	54.0

Graph of annual mean discharges for period of record 1956-94



06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1956-94

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.20	0.20	0.00	0.00	0.00	0.00	0.70	0.50	0.48	0.30	0.14	0.10	0.00
95	0.60	0.60	0.10	0.00	0.00	0.20	1.3	0.94	0.97	0.80	0.60	0.38	0.17
90	0.90	0.90	0.40	0.00	0.00	0.58	2.2	1.9	1.8	1.4	1.2	0.61	0.60
85	1.2	1.2	0.60	0.00	0.00	1.2	3.9	3.0	3.5	2.5	1.6	1.3	1.0
80	1.5	1.5	0.90	0.10	0.10	3.0	7.2	5.8	8.0	3.7	2.1	1.8	1.5
75	2.2	2.1	1.2	0.40	0.20	4.0	9.9	8.2	11	5.4	2.6	2.9	2.1
70	3.3	3.5	1.6	0.60	0.30	6.5	14	10	14	7.1	3.7	3.9	3.4
60	4.8	5.0	2.8	1.0	0.80	11	20	14	22	13	6.8	5.3	6.2
50	6.5	6.4	4.0	1.5	2.0	20	29	25	35	19	9.4	7.3	10
40	9.9	9.3	5.5	3.0	9.0	38	41	38	50	27	13	9.3	18
30	21	15	9.2	8.4	15	62	72	58	68	38	20	15	31
25	25	19	17	20	23	84	88	71	82	45	25	24	40
20	32	31	29	25	30	108	112	104	103	57	30	29	52
15	41	51	38	32	40	150	159	140	140	90	40	41	70
10	66	77	52	42	60	234	242	177	230	133	61	56	102
5	92	100	74	50	149	500	388	228	398	210	92	87	186

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 40 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	103
0.95	1.05	276
0.90	1.11	451
0.80	1.25	788
0.50	2	2,070
0.20	5	4,780
0.10	10	7,060
0.04	25	10,300
0.02	50	13,000
0.01	100	15,700
0.005	200	18,500

Magnitude and frequency of annual high discharges, based on period of record 1956-94

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	25	14	8.2	5.3
0.95	1.05	78	43	25	17
0.90	1.11	135	76	44	29
0.80	1.25	253	143	84	55
0.50	2	736	423	251	160
0.20	5	1,830	1,070	645	395
0.10	10	2,770	1,630	998	594
0.04	25	4,130	2,460	1,530	876
0.02	50	5,230	3,140	1,960	1,100
0.01	100	6,380	3,840	2,430	1,330
0.005	200	7,560	4,570	2,920	1,560

06600300 WEST BRANCH FLOYD RIVER NEAR STRUBLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1956 to March 1994

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.11
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.19
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.19	0.40
0.10	10	0.00	0.00	0.00	0.00	0.00	0.04	0.15	0.39	0.76
0.20	5	0.00	0.00	0.00	0.00	0.04	0.19	0.44	0.89	1.6
0.50	2	0.73	0.76	0.87	0.90	1.3	1.9	3.0	4.1	6.6
0.80	1.25	5.8	6.1	6.6	7.2	8.2	12	15	17	24
0.90	1.11	14	15	16	18	20	26	32	35	45
0.96	1.04	32	34	36	41	47	58	65	74	87
0.98	1.02	52	56	60	69	83	93	99	119	131
0.99	1.01	82	89	95	111	130	139	140	179	187

Magnitude and frequency of seasonal low discharges, based on period of record October 1955 to March 1995

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.06	0.13	0.18	0.25
0.02	50	0.00	0.00	0.00	0.00	0.12	0.24	0.31	0.44
0.05	20	0.00	0.00	0.00	0.00	0.31	0.55	0.69	0.97
0.10	10	0.00	0.00	0.00	0.00	0.72	1.1	1.4	1.9
0.20	5	0.00	0.00	0.00	0.02	1.9	2.6	3.0	4.1
0.50	2	0.79	0.93	0.97	1.4	9.3	11	13	16
0.80	1.25	8.0	8.7	9.7	11	37	41	46	58
0.90	1.11	20	22	26	29	69	78	86	105
0.96	1.04	47	49	63	71	127	147	161	193
0.98	1.02	78	80	108	125	181	217	238	280
0.99	1.01	123	125	176	210	245	304	333	385
		July-August-September				October-November-December			
0.01	100	0.00	0.04	0.07	0.12	0.00	0.00	0.00	0.04
0.02	50	0.00	0.07	0.11	0.20	0.00	0.00	0.00	0.08
0.05	20	0.10	0.18	0.26	0.40	0.00	0.00	0.05	0.19
0.10	10	0.27	0.39	0.51	0.73	0.00	0.12	0.17	0.39
0.20	5	0.74	0.93	1.1	1.5	0.39	0.43	0.55	0.92
0.50	2	3.6	4.2	4.6	5.6	2.4	2.9	3.4	4.3
0.80	1.25	14	15	16	19	9.8	13	15	18
0.90	1.11	26	28	29	36	20	27	31	35
0.96	1.04	48	50	54	68	42	54	62	69
0.98	1.02	71	73	78	101	69	83	94	105
0.99	1.01	99	102	107	144	108	121	134	152

06600500 FLOYD RIVER AT JAMES, IOWA

LOCATION.—Lat 42°34'36", long 96°18'43", in SE1/4 SE1/4 sec. 30, T90N, R46W, Plymouth County, Hydrologic Unit 10230002, on left bank at upstream side of bridge on County Highway C70, 0.2 mi east of James, 14.3 mi downstream from West Branch Floyd River, and at mile 7.5.

DRAINAGE AREA.—886 mi^2.

PERIOD OF RECORD.—December 1934 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,092.59 ft above sea level. Prior to September 11, 1938, June 9 to November 5, 1935, and October 1, 1955, to May 22, 1957, nonrecording gage and May 23, 1957, to September 30, 1970, water-stage recorder at same site and datum 10.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 71,500 ft^3/s, June 8, 1953, gage height, 35.3 ft current datum, from flood marks and rating curve extended above 16,000 ft^3/s on basis of contracted-opening and bank-overflow measurement of peak flow; minimum daily discharge, 0.90 ft^3/s, January 10–17, 1977.

Selected values from rating table number 27, developed March 1993

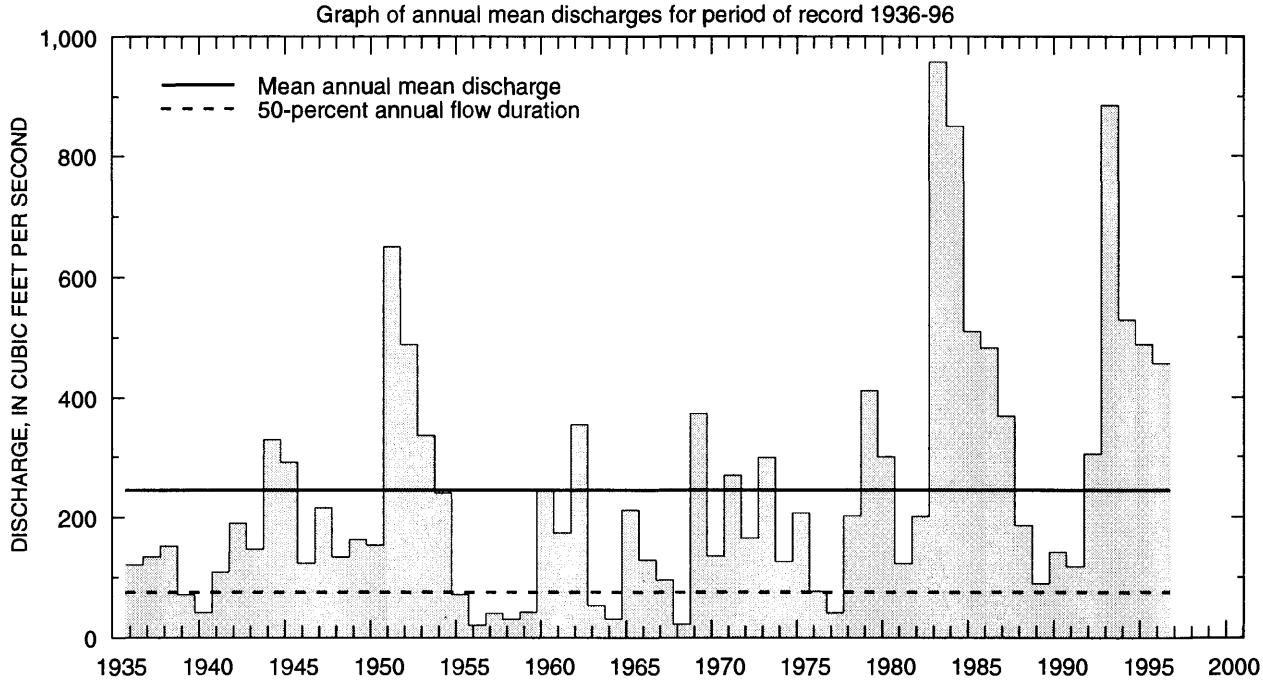
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.5	76.0	18.0	5,270
10.0	162	21.0	8,200
11.0	424	24.0	11,600
12.0	799	27.0	15,300
14.0	1,730	30.0	21,400
16.0	3,340	35.3	71,500

06600500 FLOYD RIVER AT JAMES, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1936-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	617	1993	4.55	1959	111	144
November	804	1980	4.54	1959	105	144
December	366	1980	3.05	1959	78.9	98.6
January	359	1973	1.63	1959	57.6	77.4
February	970	1952	1.62	1959	170	235
March	2,080	1979	21.5	1964	536	514
April	2,715	1969	18.7	1959	432	574
May	1,393	1984	15.1	1968	315	330
June	2,897	1984	14.4	1968	525	625
July	2,196	1993	7.32	1936	298	365
August	1,151	1951	6.12	1958	162	196
September	1,353	1951	3.40	1958	139	200
Annual	958	1983	19.9	1956	244	211

Graph of annual mean discharges for period of record 1936-96



06600500 FLOYD RIVER AT JAMES, IOWA—Continued

Monthly and annual flow durations, based on period of record 1936-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	4.5	4.6	3.0	1.4	1.2	7.0	16	12	8.8	6.6	2.8	3.4	3.0
95	8.0	9.6	5.6	3.0	4.5	12	24	19	17	14	11	8.0	8.0
90	13	13	8.0	6.0	8.0	20	38	30	28	21	15	12	12
85	15	15	11	7.0	9.0	30	50	40	44	30	19	16	16
80	17	18	15	9.0	9.6	50	61	52	56	39	24	20	21
75	24	25	17	10	10	60	78	66	73	48	30	26	27
70	30	31	19	11	13	79	89	78	95	57	37	35	34
60	41	40	25	15	22	120	120	103	153	95	54	47	50
50	48	47	32	20	34	176	162	158	222	133	78	59	75
40	58	59	41	28	66	252	223	222	297	183	103	77	117
30	83	82	60	40	106	378	317	293	409	258	145	127	183
25	121	97	77	61	149	466	380	351	494	311	177	158	227
20	162	143	125	110	180	577	489	442	605	406	229	192	290
15	196	237	182	140	230	824	662	626	814	542	280	239	376
10	390	315	240	180	350	1,280	930	805	1,200	740	392	319	515
5	465	387	329	210	720	2,250	1,590	1,120	1,890	1,080	552	452	903

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 66 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	433
0.95	1.05	848
0.90	1.11	1,210
0.80	1.25	1,840
0.50	2	4,050
0.20	5	8,720
0.10	10	12,900
0.04	25	19,500
0.02	50	25,400
0.01	100	32,000
0.005	200	39,600

Magnitude and frequency of annual high discharges, based on period of record 1936-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	141	82	54	36
0.95	1.05	362	232	155	106
0.90	1.11	579	384	258	177
0.80	1.25	991	677	457	313
0.50	2	2,540	1,770	1,180	793
0.20	5	5,830	3,940	2,560	1,650
0.10	10	8,610	5,640	3,590	2,250
0.04	25	12,700	7,940	4,910	2,980
0.02	50	16,000	9,690	5,880	3,480
0.01	100	19,500	11,400	6,810	3,950
0.005	200	23,200	13,100	7,690	4,370

06600500 FLOYD RIVER AT JAMES, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1935 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.80	0.92	0.96	1.0	1.4	2.0	2.5	3.2	3.8
0.02	50	1.1	1.2	1.3	1.4	1.9	2.6	3.3	4.2	5.1
0.05	20	1.7	1.9	2.0	2.2	2.8	3.9	5.0	6.2	8.1
0.10	10	2.7	2.9	3.1	3.3	4.2	5.6	7.2	8.9	12
0.20	5	4.5	4.9	5.1	5.5	6.7	8.9	12	14	20
0.50	2	13	14	14	15	18	23	29	35	51
0.80	1.25	37	39	41	45	51	63	80	92	129
0.90	1.11	66	70	74	81	92	111	137	157	210
0.96	1.04	125	131	139	152	175	207	250	281	354
0.98	1.02	188	198	211	230	268	314	372	414	496
0.99	1.01	275	289	309	336	397	461	536	591	671

Magnitude and frequency of seasonal low discharges, based on period of record January 1935 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.95	0.96	1.0	1.5	2.5	4.6	5.5	7.8
0.02	50	1.3	1.3	1.4	2.0	3.7	6.4	7.5	11
0.05	20	2.0	2.1	2.2	3.1	6.8	10	12	17
0.10	10	3.1	3.2	3.4	4.6	11	16	18	25
0.20	5	5.2	5.5	5.8	7.6	21	27	31	41
0.50	2	15	16	17	21	65	73	82	107
0.80	1.25	44	48	51	61	185	200	220	280
0.90	1.11	80	86	94	111	311	339	368	465
0.96	1.04	153	166	183	212	530	596	638	801
0.98	1.02	234	255	284	326	739	857	910	1,140
0.99	1.01	347	377	424	483	990	1,190	1,250	1,570
		July-August-September				October-November-December			
0.01	100	1.5	2.0	2.2	2.6	1.8	2.3	2.6	3.2
0.02	50	2.1	2.9	3.1	3.8	2.3	2.9	3.3	4.0
0.05	20	3.7	4.8	5.2	6.6	3.4	4.2	4.7	5.9
0.10	10	6.1	7.5	8.2	11	4.8	5.9	6.7	8.4
0.20	5	11	13	14	18	7.6	9.1	10	13
0.50	2	31	35	38	50	19	23	26	33
0.80	1.25	84	91	100	128	52	65	73	88
0.90	1.11	139	149	161	204	91	116	131	154
0.96	1.04	232	250	266	327	171	226	254	285
0.98	1.02	321	348	365	439	260	354	398	431
0.99	1.01	427	466	482	569	384	539	603	631

06602020 WEST FORK DITCH AT HORNICK, IOWA

LOCATION.—Lat 42°13'37", long 96°04'40", in SW1/4 SW1/4 sec. 27, T86N, R45W, Woodbury County, Hydrologic Unit 10230004, on left bank at upstream side of State Highway 141 bridge, 1.0 mi east of Hornick, 9.2 mi upstream from Wolf Creek, and 13.5 mi north of Onawa.

DRAINAGE AREA.—403 mi^2.

PERIOD OF RECORD.—April 1939 to September 1969 (published as "Holly Springs"), July 1974 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,045.82 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,400 ft^3/s, March 28, 1962, gage height 22.46 ft, site and datum then in use; maximum gage height, 25.87 ft, June 22, 1996; minimum daily discharge, 0.2 ft^3/s, July 30, August 17, 1956.

Selected values from rating table number 8, developed October 1989

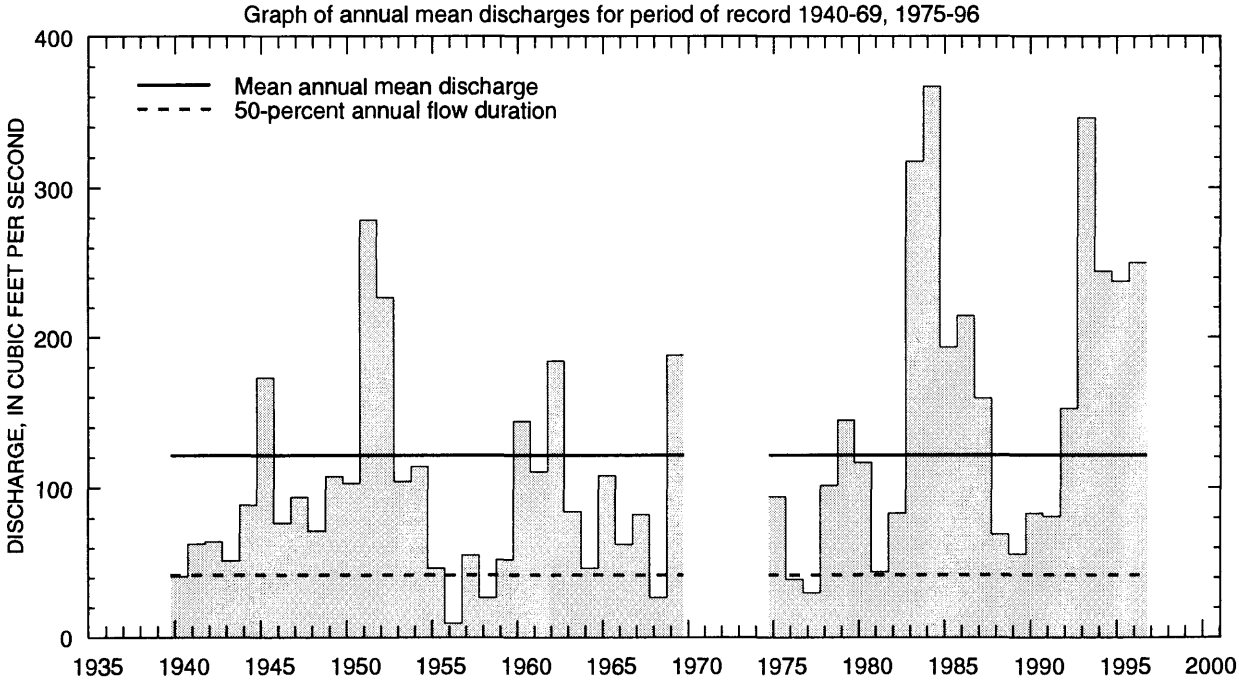
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	25.8	10.0	700
6.0	84.8	12.0	1,130
7.0	179	15.0	1,950
8.0	312	18.0	3,430
9.0	486	21.5	7,000

06602020 WEST FORK DITCH AT HORNICK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1940-69, 1975-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	369	1993	2.08	1957	60.3	69.5
November	281	1980	4.06	1959	53.0	57.1
December	199	1985	2.60	1959	43.1	46.5
January	127	1952	2.26	1959	33.5	34.9
February	522	1994	2.41	1940	103	119
March	813	1962	8.41	1957	228	214
April	837	1969	9.80	1957	178	209
May	585	1983	11.5	1943	154	144
June	2,131	1984	7.71	1956	280	339
July	561	1993	11.5	1956	147	131
August	605	1951	2.92	1956	104	121
September	422	1951	2.23	1956	71.4	76.3
Annual	367	1984	9.28	1956	121	85.7

Graph of annual mean discharges for period of record 1940-69, 1975-96



06602020 WEST FORK DITCH AT HORNICK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1940-69, 1975-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.4	3.5	2.4	2.0	2.0	7.2	7.7	8.6	5.5	5.0	2.0	1.9	2.0
95	3.3	5.0	4.0	2.3	3.0	12	11	14	14	12	6.4	5.9	6.0
90	9.1	9.4	6.0	4.0	6.0	20	18	17	21	17	12	9.5	10
85	11	12	8.2	5.5	9.0	24	24	23	30	20	15	13	13
80	14	15	11	8.2	10	28	28	29	36	25	17	15	16
75	16	17	12	10	11	31	35	34	44	30	19	18	19
70	18	20	14	10	12	37	40	39	52	36	23	21	22
60	24	24	18	14	18	50	54	55	74	48	32	28	31
50	28	30	23	18	30	79	76	78	108	66	43	34	42
40	35	36	31	22	45	103	116	111	144	100	58	48	64
30	58	50	43	32	71	150	162	150	195	140	86	71	94
25	71	64	51	42	90	185	186	176	231	174	102	82	117
20	83	78	68	60	105	225	227	220	304	217	130	99	142
15	125	115	84	76	140	300	296	277	414	278	165	123	180
10	150	140	120	90	200	465	375	350	613	355	213	159	247
5	197	183	147	106	455	900	562	505	1,030	499	323	220	416

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 53 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	406
0.95	1.05	791
0.90	1.11	1,110
0.80	1.25	1,630
0.50	2	3,230
0.20	5	5,950
0.10	10	7,970
0.04	25	10,700
0.02	50	12,800
0.01	100	14,900
0.005	200	17,000

Magnitude and frequency of annual high discharges, based on period of record 1940-69, 1975-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	130	69	42	32
0.95	1.05	312	177	110	82
0.90	1.11	476	278	174	127
0.80	1.25	763	457	287	205
0.50	2	1,670	1,040	642	436
0.20	5	3,160	1,990	1,190	763
0.10	10	4,180	2,630	1,540	954
0.04	25	5,410	3,390	1,940	1,160
0.02	50	6,270	3,910	2,200	1,280
0.01	100	7,070	4,390	2,430	1,380
0.005	200	7,820	4,820	2,620	1,470

06602020 WEST FORK DITCH AT HORNICK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1969, April 1975 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.31	0.40	0.61	0.91	1.3	1.8	2.1	2.4	3.1
0.02	50	0.51	0.64	0.88	1.2	1.7	2.4	2.8	3.2	4.3
0.05	20	1.0	1.2	1.5	2.0	2.6	3.5	4.3	4.9	6.6
0.10	10	1.9	2.1	2.5	3.0	3.7	5.0	6.2	7.1	9.7
0.20	5	3.7	3.9	4.3	4.8	5.9	7.7	9.7	11	15
0.50	2	11	12	12	12	14	18	23	26	35
0.80	1.25	28	29	31	32	36	43	52	59	77
0.90	1.11	42	45	49	53	60	69	81	91	114
0.96	1.04	62	67	80	89	103	115	130	143	170
0.98	1.02	77	86	108	126	147	161	175	191	219
0.99	1.01	93	106	140	171	203	218	229	248	273

Magnitude and frequency of seasonal low discharges, based on period of record July 1939 to September 1969, July 1974 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.89	0.95	1.1	1.5	2.5	3.4	3.8	5.3
0.02	50	1.2	1.3	1.5	1.9	3.4	4.6	5.1	6.9
0.05	20	2.0	2.1	2.3	2.9	5.5	7.0	8.0	10
0.10	10	3.0	3.1	3.4	4.3	8.3	10	12	15
0.20	5	4.9	5.1	5.5	6.8	14	16	19	23
0.50	2	12	13	14	17	35	40	46	56
0.80	1.25	30	34	36	43	89	98	112	133
0.90	1.11	48	55	60	70	144	158	177	212
0.96	1.04	78	92	103	120	239	261	286	349
0.98	1.02	105	128	147	171	331	362	390	482
0.99	1.01	138	173	202	235	442	486	515	646
		July-August-September				October-November-December			
0.01	100	0.38	0.83	1.3	2.3	0.70	1.2	1.5	1.9
0.02	50	0.72	1.3	1.9	3.2	1.1	1.6	2.0	2.5
0.05	20	1.7	2.6	3.3	5.2	1.9	2.7	3.2	3.9
0.10	10	3.4	4.6	5.4	8.0	3.2	4.1	4.8	5.8
0.20	5	7.2	8.5	9.4	13	5.6	6.8	7.8	9.3
0.50	2	23	24	25	33	15	17	19	22
0.80	1.25	55	58	61	76	34	42	47	53
0.90	1.11	78	85	94	114	51	67	74	84
0.96	1.04	104	123	144	174	74	106	119	134
0.98	1.02	120	151	187	226	92	143	163	182
0.99	1.01	135	180	233	284	112	186	215	238

06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA

LOCATION.—Lat 41°57'52", long 95°59'30", in NW1/4 NE1/4 sec. 32, T83N, R44W, Monona County, Hydrologic Unit 10230004, on left pier at downstream side of bridge on County Highway E54, 1.0 mi west of gaging station of Little Sioux River near Turin, 4 mi southwest of Turin, 5.2 mi northeast of Blencoe and 12.5 mi upstream from mouth.

DRAINAGE AREA.—900 mi^2.

PERIOD OF RECORD.—May 1942 to September 1996. Streamflows affected by diversion from Little Sioux River through equalizer ditch 1.5 mi upstream 1942 to 1958, and occasional diversions to and from Little Sioux River through diversion ditch 8.3 miles upstream since 1958.

GAGE.—Water-stage recorder. Datum of gage is 1,015.00 ft above sea level (U.S. Army Corps of Engineers benchmark). Prior to May 7, 1942, nonrecording gage at site 4.8 mi downstream at datum 5.40 ft lower. May 7, 1942 to October 13, 1953, nonrecording gage and October 14, 1953 to September 30, 1975, recording gage at same site at datum 5.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 19,900 ft^3/s, February 19, 1971, gage height, 28.03 ft; minimum daily discharge, 8.5 ft^3/s, January 3–11, 1959.

REMARKS.—Statistics computed for record collected since February 1958.

Selected values from rating table number 22, developed October 1995

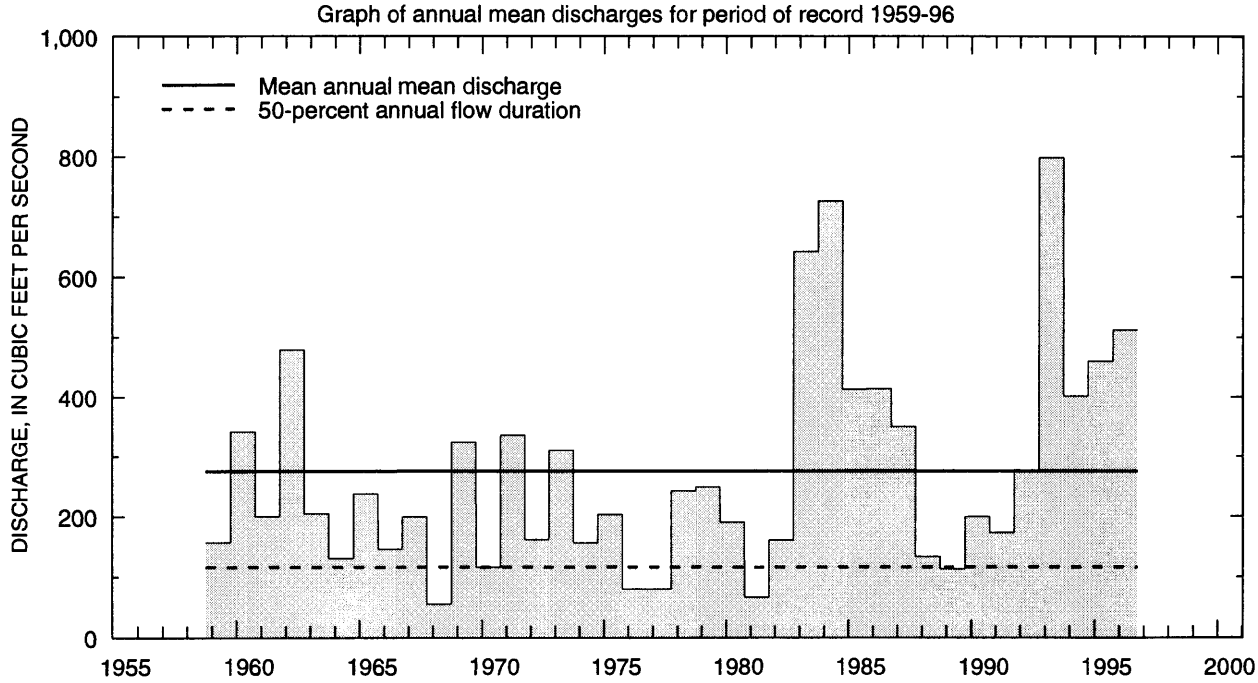
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	160	15.0	3,730
5.0	333	18.0	5,400
6.0	512	21.0	7,310
9.0	1,180	24.0	10,700
12.0	2,320	27.0	17,300

06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	831	1993	16.0	1959	150	151
November	415	1980	18.0	1959	130	97.5
December	421	1985	11.4	1959	111	92.7
January	398	1973	10.5	1959	90.9	80.4
February	1,963	1971	13.9	1959	218	334
March	1,707	1962	46.9	1968	502	477
April	1,588	1965	41.1	1968	448	478
May	1,157	1995	43.7	1968	389	314
June	3,833	1984	71.8	1989	586	680
July	2,107	1993	46.1	1976	345	417
August	883	1996	30.6	1976	187	175
September	576	1993	30.8	1981	142	115
Annual	798	1993	55.5	1968	275	180

Graph of annual mean discharges for period of record 1959-96



06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	15	18	11	9.4	12	26	29	30	22	36	25	24	18
95	33	30	22	24	20	38	47	46	63	48	35	30	30
90	39	36	27	27	28	50	57	58	80	58	41	36	37
85	45	42	30	30	31	60	65	75	99	65	46	44	44
80	49	48	34	32	36	70	76	89	114	72	52	50	51
75	53	54	39	35	40	82	88	105	129	79	58	55	58
70	59	59	45	39	42	97	108	128	147	88	67	60	66
60	68	73	54	43	55	129	145	158	185	112	86	69	88
50	81	93	72	52	86	166	197	209	229	143	102	86	116
40	101	120	92	70	110	221	254	263	299	198	127	119	153
30	145	150	120	110	150	314	315	348	405	290	169	154	203
25	169	174	141	136	170	400	389	447	494	360	200	170	238
20	210	210	166	150	200	524	499	565	624	436	239	194	286
15	244	236	197	170	245	720	636	681	849	545	292	232	356
10	289	270	232	190	318	1,120	928	856	1,200	679	353	284	514
5	392	339	300	220	623	2,180	1,750	1,200	2,470	1,110	518	381	905

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 39 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	761
0.95	1.05	1,500
0.90	1.11	2,090
0.80	1.25	3,050
0.50	2	5,850
0.20	5	10,200
0.10	10	13,200
0.04	25	16,900
0.02	50	19,600
0.01	100	22,100
0.005	200	24,600

[a] Analysis includes only peak discharges for the period 1958-96.

Magnitude and frequency of annual high discharges, based on period of record 1959-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	343	195	128	101
0.95	1.05	754	432	277	210
0.90	1.11	1,100	642	408	301
0.80	1.25	1,690	1,010	635	456
0.50	2	3,470	2,200	1,380	938
0.20	5	6,280	4,350	2,750	1,760
0.10	10	8,160	5,970	3,810	2,370
0.04	25	10,500	8,140	5,260	3,160
0.02	50	12,100	9,800	6,390	3,760
0.01	100	13,600	11,500	7,540	4,360
0.005	200	15,000	13,100	8,720	4,960

06602400 MONONA-HARRISON DITCH NEAR TURIN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	7.7	8.3	8.8	9.4	11	12	12	14	15
0.02	50	9.2	9.8	10	11	13	14	15	17	19
0.05	20	12	13	13	14	17	19	20	23	26
0.10	10	15	16	17	18	21	24	27	30	34
0.20	5	21	22	23	24	28	32	37	41	48
0.50	2	36	39	41	44	50	58	68	77	92
0.80	1.25	65	70	75	82	94	108	126	140	172
0.90	1.11	87	96	104	114	132	150	174	191	238
0.96	1.04	121	135	149	166	194	215	246	264	334
0.98	1.02	150	169	189	211	250	272	307	325	416
0.99	1.01	181	208	234	264	316	337	376	392	505

Magnitude and frequency of seasonal low discharges, based on period of record April 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7.8	8.5	8.9	11	14	18	22	26
0.02	50	9.7	10	11	13	17	21	26	31
0.05	20	13	14	15	17	24	29	34	40
0.10	10	18	19	20	22	32	38	43	52
0.20	5	24	26	28	31	47	53	60	72
0.50	2	45	49	52	58	96	104	116	141
0.80	1.25	80	90	99	110	199	218	240	293
0.90	1.11	107	123	137	154	293	328	361	441
0.96	1.04	144	170	195	223	446	514	571	695
0.98	1.02	175	209	244	284	587	693	776	944
0.99	1.01	206	252	299	354	752	913	1,030	1,250
		July-August-September				October-November-December			
0.01	100	12	14	16	18	8.9	9.6	11	13
0.02	50	14	17	18	21	11	12	13	15
0.05	20	18	21	23	27	14	16	18	21
0.10	10	24	27	29	33	19	21	23	27
0.20	5	32	35	38	44	25	29	31	36
0.50	2	58	63	68	80	46	55	59	68
0.80	1.25	110	117	126	153	81	105	114	128
0.90	1.11	155	165	179	219	110	148	162	179
0.96	1.04	227	242	264	326	151	215	237	259
0.98	1.02	292	312	343	426	185	273	305	329
0.99	1.01	368	395	436	546	222	340	382	409

06605000 OCHEYEDAN RIVER NEAR SPENCER, IOWA

LOCATION.—Lat 43°07'44", long 95°12'37", in SW1/4 SW1/4 sec. 15, T96N, R37W, Clay County, Hydrologic Unit 10230003, on left bank 3 ft upstream from bridge on County Highway M38, 3.4 mi west by southwest of Spencer, and at mile 4.1.

DRAINAGE AREA.—426 mi^2.

PERIOD OF RECORD.—October 1977 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,311.66 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 6,450 ft^3/s, June 21, 1983, gage height, 10.49 ft; maximum gage height, 11.28 ft; July 1, 1993, no flow January 24–March 9, 1979, December 22, 1989–January 5, 1990.

Selected values from rating table number 4, developed October 1992

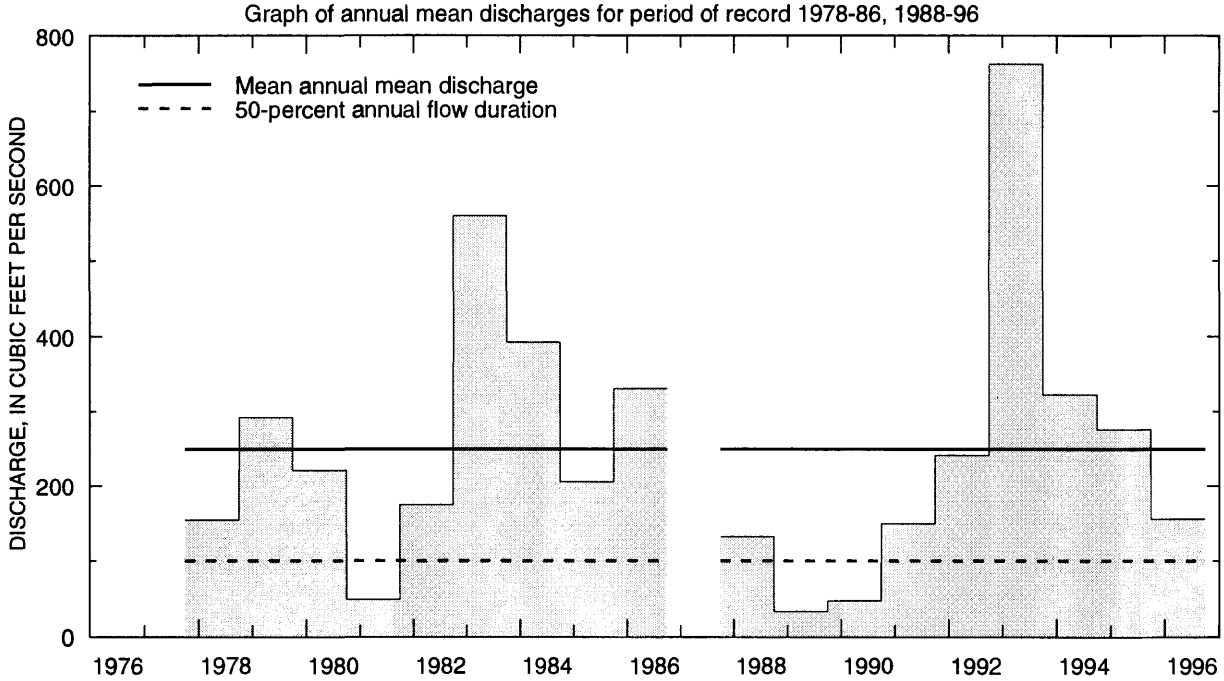
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	61.6	7.0	1,220
3.0	196	8.0	1,580
4.0	385	9.0	2,120
5.0	622	10.0	3,360
6.0	902	11.0	5,440

06605000 OCHEYEDAN RIVER NEAR SPENCER, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1978-86, 1988-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	492	1983	9.23	1990	137	148
November	796	1980	8.11	1990	159	203
December	305	1983	1.91	1990	85.8	89.8
January	180	1983	0.51	1979	47.8	46.8
February	402	1983	0.000	1979	86.7	100
March	1,019	1983	14.0	1990	355	275
April	1,463	1983	20.5	1990	509	417
May	912	1993	54.9	1981	406	267
June	1,973	1993	33.8	1989	542	552
July	2,243	1993	33.4	1989	368	514
August	706	1993	15.3	1989	165	193
September	597	1979	14.2	1988	134	158
Annual	763	1993	33.4	1989	250	184

Graph of annual mean discharges for period of record 1978-86, 1988-96



06605000 OCHEYEDAN RIVER NEAR SPENCER, IOWA—Continued

Monthly and annual flow durations, based on period of record 1978-86, 1988-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.1	6.0	0.00	0.00	0.00	0.00	19	22	26	21	12	9.7	0.04
95	11	11	3.6	0.43	0.00	7.0	22	36	46	27	15	13	7.9
90	15	15	8.7	2.5	3.5	19	47	55	65	36	21	16	14
85	17	17	11	4.2	6.7	25	72	87	96	45	29	20	20
80	18	22	16	5.4	8.0	48	133	111	135	55	35	22	27
75	26	26	21	8.8	8.6	62	165	137	165	71	41	26	36
70	30	35	28	12	9.8	71	179	160	184	85	48	29	47
60	40	55	38	21	25	112	246	245	244	112	60	40	69
50	63	79	58	36	44	170	332	349	290	159	82	57	100
40	102	111	75	54	62	238	439	431	350	218	105	90	152
30	183	152	94	68	74	341	600	508	424	310	132	135	230
25	195	178	110	74	92	421	690	547	500	370	156	170	284
20	226	248	126	78	122	520	782	607	670	461	201	220	351
15	254	313	160	86	148	601	942	697	903	615	269	281	447
10	300	376	217	109	200	789	1,170	812	1,460	848	386	345	601
5	429	589	290	136	304	1,580	1,580	980	2,200	1,450	623	500	920

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 27 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	458
0.95	1.05	790
0.90	1.11	1,050
0.80	1.25	1,480
0.50	2	2,840
0.20	5	5,360
0.10	10	7,440
0.04	25	10,500
0.02	50	13,100
0.01	100	16,000
0.005	200	19,100

Magnitude and frequency of annual high discharges, based on period of record 1978-86, 1988-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	252	153	93	61
0.95	1.05	481	315	199	144
0.90	1.11	662	447	289	218
0.80	1.25	952	663	442	343
0.50	2	1,770	1,290	918	725
0.20	5	3,030	2,230	1,720	1,320
0.10	10	3,870	2,840	2,300	1,700
0.04	25	4,920	3,580	3,050	2,150
0.02	50	5,660	4,090	3,610	2,450
0.01	100	6,380	4,570	4,150	2,720
0.005	200	7,060	5,010	4,690	2,960

06605000 OCHEYEDAN RIVER NEAR SPENCER, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1978 to March 1986, April 1987 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.01	0.45	1.3	2.6
0.02	50	0.00	0.00	0.00	0.00	0.00	0.03	0.87	2.1	4.0
0.05	20	0.00	0.00	0.00	0.00	0.00	0.26	2.2	4.3	7.2
0.10	10	0.00	0.00	0.00	0.00	1.1	1.2	4.6	7.7	12
0.20	5	4.2	4.4	4.8	5.2	5.2	5.3	10	15	22
0.50	2	19	19	20	22	24	35	38	46	62
0.80	1.25	43	44	47	52	60	82	100	116	159
0.90	1.11	58	61	66	72	82	99	148	176	251
0.96	1.04	76	80	87	96	104	107	208	262	397
0.98	1.02	88	92	101	112	115	130	250	329	525
0.99	1.01	98	104	114	127	130	180	287	397	669

Magnitude and frequency of seasonal low discharges, based on period of record October 1977 to February 1987, April 1987 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	9.0	10	11	11
0.02	50	0.00	0.00	0.00	0.00	13	14	15	16
0.05	20	0.00	0.00	0.00	0.00	20	23	25	29
0.10	10	0.00	0.66	1.7	2.3	31	35	39	47
0.20	5	4.5	4.7	5.3	6.4	49	56	64	79
0.50	2	21	24	24	25	113	128	150	193
0.80	1.25	54	65	66	68	236	264	313	404
0.90	1.11	81	90	103	107	334	371	439	562
0.96	1.04	115	120	152	164	471	517	610	767
0.98	1.02	142	150	189	210	580	632	742	919
0.99	1.01	168	190	226	259	693	749	876	1,070
		July-August-September				October-November-December			
0.01	100	5.3	5.7	6.4	7.5	0.00	0.00	0.04	1.0
0.02	50	6.5	7.0	7.8	9.2	0.00	0.00	0.14	1.8
0.05	20	8.9	9.6	11	13	0.00	0.00	0.75	3.9
0.10	10	12	13	14	17	2.9	4.0	4.5	7.5
0.20	5	17	18	20	24	7.3	9.8	11	15
0.50	2	35	39	42	52	28	35	40	51
0.80	1.25	77	85	94	121	80	98	128	135
0.90	1.11	119	132	147	195	129	157	160	207
0.96	1.04	192	213	241	331	205	248	270	309
0.98	1.02	265	294	335	473	271	328	350	388
0.99	1.01	356	394	454	659	345	417	450	468

06605600 LITTLE SIOUX RIVER AT GILLET GROVE, IOWA

LOCATION.—Lat 43°01'06", long 95°02'34", in SW1/4 NE1/4 sec. 25, T95N, R36W, Clay County, Hydrologic Unit 10230003, on left bank 5 ft downstream from bridge on County Highway B53, 0.4 mi northwest of Gillet Grove, 0.9 mi above Elk Creek and at mile 146.1.

DRAINAGE AREA.—1,334 mi^2.

PERIOD OF RECORD.—June 1958 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,266.84 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,200 ft^3/s, April 7, 1965, gage height, 18.67 ft; minimum daily discharge, 1.0 ft^3/s, February 3–27, 1959.

Selected values from rating table number 8, developed October 1969
(A discharge measurement to validate this rating has not been made since October 1973)

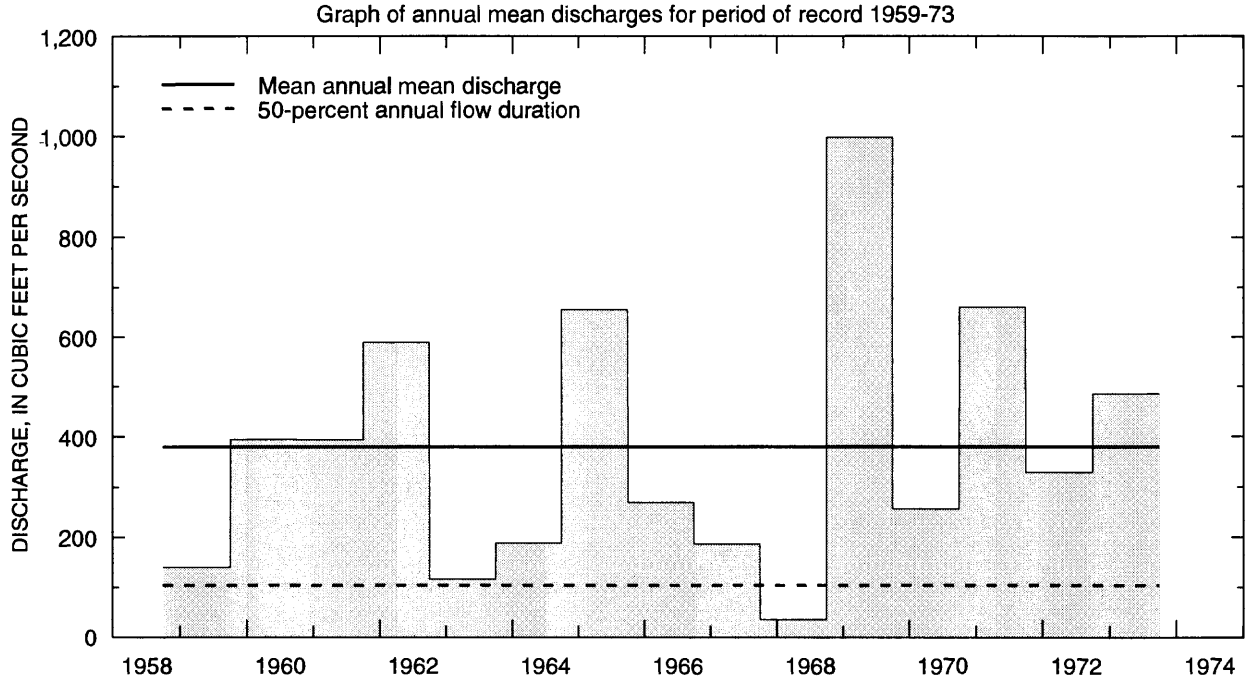
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	37	6.0	524
3.2	59	8.0	1,030
3.5	96	10.0	1,750
4.0	166	12.0	3,100
4.5	244	14.0	6,000
5.0	326	16.0	10,400

06605600 LITTLE SIOUX RIVER AT GILLET GROVE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-73

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	568	1969	9.43	1959	170	178
November	503	1971	13.0	1959	145	140
December	247	1971	5.89	1959	84.5	64.8
January	276	1973	2.44	1959	61.0	66.5
February	802	1971	1.01	1959	128	223
March	2,127	1961	36.1	1964	635	680
April	4,732	1965	38.0	1968	1,260	1,539
May	1,351	1960	27.4	1968	635	442
June	1,595	1971	40.2	1968	596	444
July	2,918	1969	40.6	1968	501	780
August	635	1969	15.6	1968	150	163
September	1,104	1964	24.0	1967	191	283
Annual	998	1969	35.1	1968	380	259

Graph of annual mean discharges for period of record 1959-73



06605600 LITTLE SIOUX RIVER AT GILLET GROVE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	6.3	9.2	4.4	1.2	1.0	1.3	26	22	17	18	7.9	13	2.8
95	11	14	6.8	3.2	1.0	21	31	28	52	31	20	19	13
90	21	25	8.9	6.8	10	26	43	71	70	40	31	23	22
85	25	27	21	10	15	29	96	94	88	52	35	25	27
80	28	29	25	13	17	34	126	133	131	62	39	27	32
75	32	33	30	16	20	40	164	212	173	76	45	33	40
70	37	38	33	23	21	54	204	275	240	86	50	38	48
60	55	72	47	35	28	105	389	370	327	111	59	49	69
50	100	103	66	48	32	229	616	438	404	162	72	60	104
40	135	132	80	57	41	310	792	569	506	224	97	78	161
30	163	162	102	65	50	540	999	762	631	336	132	109	270
25	186	190	112	67	57	700	1,240	890	703	466	162	161	354
20	254	220	138	72	82	896	1,490	1,020	824	599	216	194	470
15	300	274	160	98	164	1,200	1,960	1,160	962	821	262	305	640
10	394	344	185	111	192	1,590	2,890	1,400	1,190	1,380	397	553	910
5	590	460	239	185	300	2,390	4,970	1,920	1,920	2,550	529	850	1,500

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 23 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	512
0.95	1.05	961
0.90	1.11	1,340
0.80	1.25	2,010
0.50	2	4,320
0.20	5	9,250
0.10	10	13,700
0.04	25	20,900
0.02	50	27,300
0.01	100	34,800
0.005	200	43,400

Magnitude and frequency of annual high discharges, based on period of record 1959-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	411	274	159	79
0.95	1.05	766	558	369	232
0.90	1.11	1,070	808	560	385
0.80	1.25	1,600	1,250	902	665
0.50	2	3,480	2,810	2,070	1,570
0.20	5	7,600	6,070	4,280	2,990
0.10	10	11,500	8,950	6,000	3,860
0.04	25	17,800	13,400	8,380	4,800
0.02	50	23,600	17,300	10,200	5,390
0.01	100	30,500	21,600	12,100	5,890
0.005	200	38,600	26,500	14,000	6,300

06605600 LITTLE SIOUX RIVER AT GILLET GROVE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.8	2.8	3.0	3.3	4.5	5.4	7.4	8.5	8.9
0.02	50	3.5	3.5	3.8	4.1	5.5	6.9	9.1	11	12
0.05	20	4.9	5.0	5.3	5.7	7.6	9.8	13	15	17
0.10	10	6.5	6.7	7.1	7.7	9.9	13	17	19	25
0.20	5	9.3	9.5	10	11	14	19	23	27	37
0.50	2	18	19	19	21	26	35	44	53	76
0.80	1.25	35	36	37	41	48	63	82	103	149
0.90	1.11	49	50	52	57	67	84	113	147	207
0.96	1.04	71	72	74	82	94	112	160	213	290
0.98	1.02	90	91	93	104	117	134	200	271	358
0.99	1.01	110	111	115	127	142	157	243	338	430

Magnitude and frequency of seasonal low discharges, based on period of record July 1958 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.55	0.56	0.58	0.63	5.8	7.0	8.8	9.6
0.02	50	0.97	1.0	1.0	1.1	9.3	11	14	15
0.05	20	2.1	2.2	2.3	2.6	18	21	25	30
0.10	10	4.0	4.2	4.3	5.0	30	36	42	51
0.20	5	8.0	8.4	8.8	10	54	65	74	93
0.50	2	24	25	26	32	139	164	188	246
0.80	1.25	52	56	61	75	295	336	393	532
0.90	1.11	72	76	84	107	406	452	540	739
0.96	1.04	94	100	112	145	542	587	721	995
0.98	1.02	108	115	131	171	636	677	848	1,170
0.99	1.01	121	128	147	193	724	757	966	1,340
		July-August-September				October-November-December			
0.01	100	2.1	2.9	3.6	5.1	2.0	2.1	2.2	3.3
0.02	50	3.1	4.1	5.0	6.5	3.1	3.2	3.4	4.8
0.05	20	5.5	6.7	7.8	9.5	5.5	5.9	6.3	8.5
0.10	10	8.6	10	12	13	8.8	9.7	10	13
0.20	5	14	16	18	20	15	17	18	23
0.50	2	34	36	40	46	34	40	46	56
0.80	1.25	68	75	83	108	64	77	99	119
0.90	1.11	93	104	118	171	83	101	139	168
0.96	1.04	124	146	168	281	104	127	191	234
0.98	1.02	146	178	209	389	118	145	228	284
0.99	1.01	168	211	253	523	131	160	265	334

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IOWA

LOCATION.—Lat 42°53'24", long 95°14'30", in SW1/4 SW1/4 sec. 5, T93N, R37W, Buena Vista County, Hydrologic Unit 10230003, on right bank at downstream side of bridge on County Highway M36, in Linn Grove, and at mile 123.7.

DRAINAGE AREA.—1,548 mi^2.

PERIOD OF RECORD.—October 1972 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1223.60 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 16,100 ft^3/s, July 2, 1993, gage height, 20.63 ft; minimum daily discharge, 0.70 ft^3/s, February 4, 1977.

Selected values from rating table number 9, developed October 1992

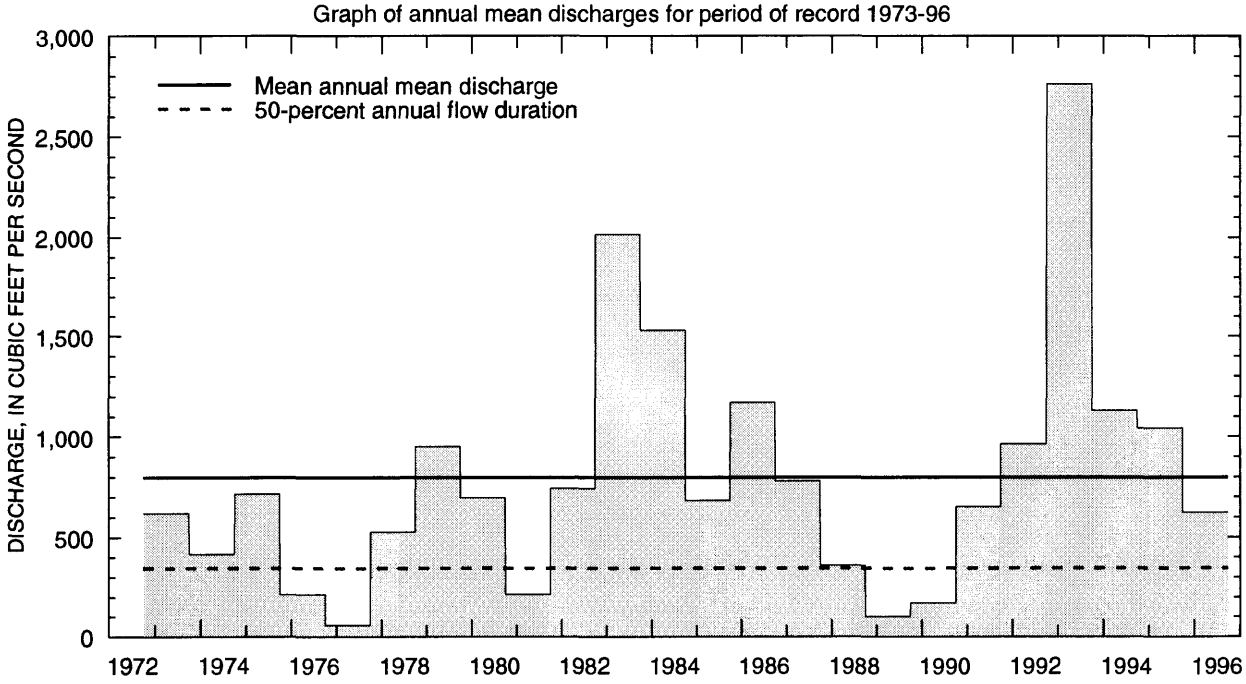
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	117	10.0	1,980
4.0	207	12.0	2,740
5.0	423	14.0	3,640
6.0	678	16.0	5,440
7.0	965	18.0	8,960
8.0	1,280	20.0	14,000

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1973-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,070	1983	21.3	1977	462	540
November	2,050	1980	22.0	1977	487	537
December	1,122	1983	6.08	1990	296	274
January	859	1983	3.12	1977	193	196
February	1,161	1983	5.92	1977	290	311
March	3,894	1983	75.9	1990	1,149	889
April	4,952	1983	77.7	1990	1,661	1,358
May	3,233	1993	69.4	1977	1,306	986
June	6,898	1993	60.3	1977	1,574	1,692
July	7,905	1993	36.3	1977	1,152	1,633
August	2,906	1993	26.4	1976	527	627
September	2,171	1993	22.7	1976	458	572
Annual	2,763	1993	56.3	1977	798	621

Graph of annual mean discharges for period of record 1973-96



06605850 LITTLE SIOUX RIVER AT LINN GROVE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1973-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	16	16	3.8	1.3	1.6	13	71	53	28	28	9.7	12	7.1
95	20	24	7.4	6.1	9.2	32	106	97	92	50	27	23	21
90	35	38	14	10	16	73	147	172	136	72	38	31	39
85	43	49	29	18	21	108	231	238	220	99	60	43	57
80	51	64	49	26	37	177	508	349	301	150	92	58	88
75	81	75	64	43	40	274	679	412	416	188	115	88	122
70	109	110	100	50	44	359	762	469	524	228	144	113	160
60	140	218	165	88	127	540	909	627	718	327	221	148	240
50	227	270	230	154	187	671	1,080	909	940	488	296	204	345
40	329	368	272	200	228	943	1,420	1,380	1,190	702	398	276	522
30	500	542	340	230	272	1,350	1,910	1,800	1,550	1,060	516	435	766
25	604	674	390	245	310	1,560	2,240	2,030	1,740	1,290	590	509	948
20	798	766	450	290	426	1,840	2,660	2,280	2,000	1,740	712	630	1,190
15	968	1,010	609	360	510	2,160	3,240	2,510	2,520	2,080	908	868	1,540
10	1,190	1,270	740	440	642	2,650	3,710	2,880	3,790	2,590	1,240	1,370	2,060
5	1,690	1,710	920	579	1,030	3,850	5,200	3,510	6,580	4,220	2,150	2,010	2,970

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	571
0.95	1.05	1,100
0.90	1.11	1,550
0.80	1.25	2,310
0.50	2	4,820
0.20	5	9,640
0.10	10	13,600
0.04	25	19,500
0.02	50	24,500
0.01	100	29,800
0.005	200	35,700

Magnitude and frequency of annual high discharges, based on period of record 1973-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	490	366	235	174
0.95	1.05	929	745	522	404
0.90	1.11	1,290	1,060	773	607
0.80	1.25	1,880	1,590	1,210	961
0.50	2	3,720	3,240	2,580	2,070
0.20	5	6,970	6,040	4,940	3,920
0.10	10	9,470	8,100	6,640	5,210
0.04	25	12,900	10,800	8,850	6,800
0.02	50	15,700	12,900	10,500	7,940
0.01	100	18,500	15,000	12,100	9,010
0.005	200	21,500	17,000	13,600	10,000

06605850 LITTLE SIOUX RIVER AT LINN GROVE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1973 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.38	0.43	0.53	0.59	0.86	1.7	2.1	3.6	5.6
0.02	50	0.85	0.94	1.1	1.2	1.7	3.0	3.8	6.0	9.0
0.05	20	2.6	2.8	3.1	3.3	4.4	6.7	8.5	12	18
0.10	10	6.2	6.5	7.1	7.5	9.5	13	17	23	32
0.20	5	16	16	17	18	22	28	35	45	62
0.50	2	64	66	68	72	81	96	123	147	197
0.80	1.25	166	174	184	198	216	260	345	402	533
0.90	1.11	235	250	271	295	320	399	545	638	848
0.96	1.04	310	335	375	415	451	592	839	996	1,330
0.98	1.02	355	388	443	496	540	740	1,080	1,300	1,750
0.99	1.01	390	431	501	567	621	885	1,320	1,610	2,200

Magnitude and frequency of seasonal low discharges, based on period of record October 1972 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.45	0.62	0.68	1.0	13	15	20	24
0.02	50	1.0	1.4	1.5	2.1	22	25	31	39
0.05	20	3.3	4.0	4.2	5.4	43	48	58	74
0.10	10	8.2	9.3	9.8	12	74	84	99	127
0.20	5	21	23	24	28	138	155	178	232
0.50	2	88	93	98	105	384	430	483	635
0.80	1.25	226	242	265	287	877	976	1,110	1,460
0.90	1.11	315	346	388	430	1,260	1,390	1,610	2,110
0.96	1.04	405	462	532	609	1,750	1,940	2,300	2,980
0.98	1.02	456	532	623	733	2,110	2,340	2,820	3,640
0.99	1.01	494	589	701	844	2,460	2,720	3,340	4,280
		July-August-September				October-November-December			
0.01	100	5.3	5.4	6.2	11	1.7	1.8	1.8	2.5
0.02	50	7.7	8.0	9.2	16	3.0	3.3	3.4	4.5
0.05	20	13	14	16	25	6.6	7.5	8.1	10
0.10	10	22	23	26	38	13	15	16	21
0.20	5	38	42	47	63	26	32	36	45
0.50	2	106	118	131	163	90	110	130	157
0.80	1.25	272	305	342	417	243	300	357	431
0.90	1.11	433	485	547	679	378	462	549	666
0.96	1.04	698	777	884	1,140	569	688	810	992
0.98	1.02	939	1,040	1,190	1,580	720	862	1,010	1,240
0.99	1.01	1,220	1,340	1,550	2,130	872	1,030	1,200	1,490

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA

LOCATION.—Lat 42°28'20", long 95°47'49", in NE1/4 NW1/4 sec. 1, T88N, R43W, Woodbury County, Hydrologic Unit 10230003, on right bank 50 ft upstream from bridge on State Highway 31, 0.3 mi upstream from Bacon Creek, 0.5 mi west of Correctionville, 0.8 mi downstream from Pierson Creek, and at mile 56.0.

DRAINAGE AREA.—2,500 mi^2.

PERIOD OF RECORD.—May 1918 to July 1925, October 1928 to July 1932, June 1936 to September 1996. Monthly discharge only for some periods, published in WSP 1310.

GAGE.—Water-stage recorder. Datum of gage is 1,096.49 ft above sea level. May 28, 1918, to July 1, 1925, and October 29, 1928 to July 15, 1929, nonrecording gage 0.2 mi downstream at datum 1.25 ft lower. July 16, 1929, to July 2, 1932, and June 15, 1936, to November 7, 1938, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 29,800 ft^3/s, April 7, 1965, gage height, 25.86 ft; minimum daily discharge, 2.6 ft^3/s, July 17, 25, 1936.

Selected values from rating table number 17, developed October 1994

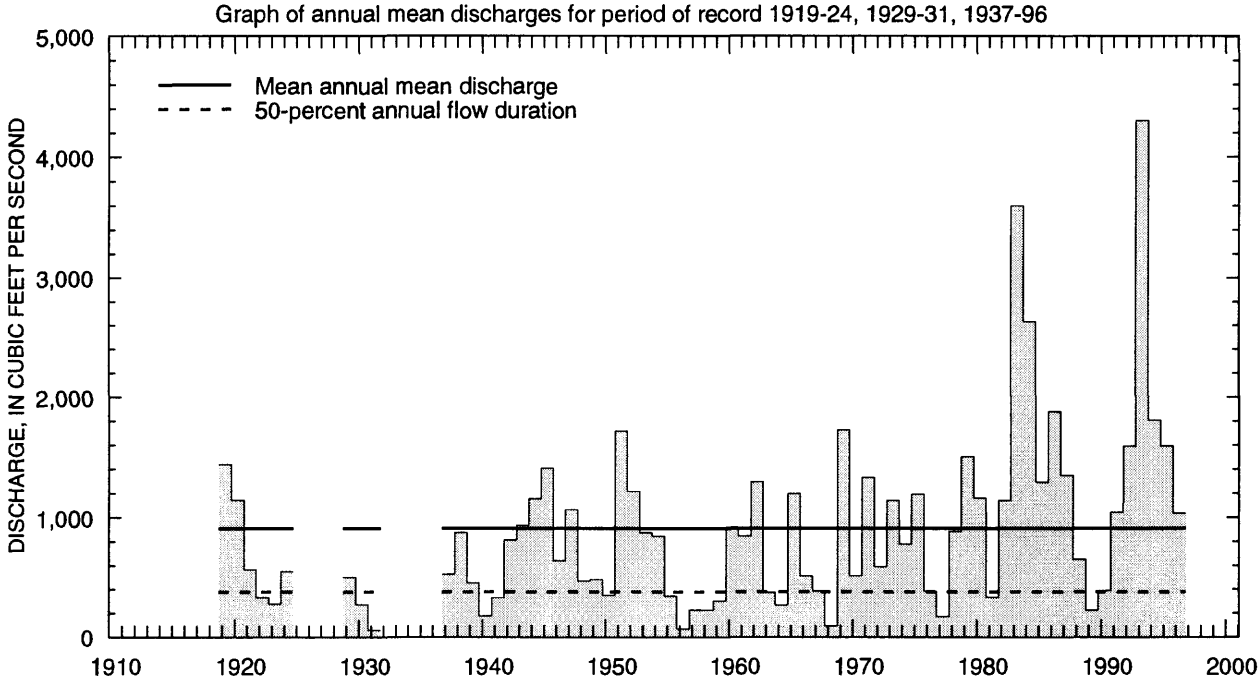
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	118	11.0	3,590
5.0	226	14.0	5,900
6.0	590	17.0	8,560
7.0	1,110	20.0	11,500
8.0	1,690	23.0	26,600
9.0	2,270		

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1919-24, 1929-31, 1937-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,994	1983	8.33	1957	452	582
November	3,079	1980	25.3	1959	444	546
December	1,698	1983	15.1	1959	304	336
January	1,323	1983	8.31	1959	220	256
February	2,708	1971	7.08	1959	457	531
March	7,328	1983	53.5	1931	1,483	1,265
April	8,677	1983	61.9	1931	1,913	2,133
May	5,002	1993	57.3	1931	1,404	1,247
June	10,110	1993	58.1	1956	1,817	1,906
July	11,600	1993	43.4	1956	1,256	1,682
August	4,469	1993	15.0	1931	618	702
September	3,671	1938	14.4	1958	528	728
Annual	4,304	1993	53.7	1931	908	753

Graph of annual mean discharges for period of record 1919-24, 1929-31, 1937-96



06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA—Continued

Monthly and annual flow durations, based on period of record 1919-24, 1929-31, 1937-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.3	24	14	9.0	7.0	41	64	52	27	23	13	11	13
95	33	40	23	14	21	69	126	127	103	75	34	24	33
90	44	55	34	22	30	110	212	200	188	114	52	45	53
85	53	68	44	32	50	150	305	278	256	137	71	56	75
80	77	80	55	40	58	206	393	336	345	174	93	74	101
75	101	112	68	50	65	280	481	406	473	211	117	89	127
70	115	132	90	70	80	400	574	500	566	256	148	107	157
60	154	192	130	94	120	605	781	702	785	390	232	152	250
50	231	250	170	120	155	900	1,050	890	1,020	594	330	232	378
40	290	340	240	145	270	1,200	1,340	1,120	1,330	838	463	334	557
30	440	476	342	210	435	1,600	1,720	1,520	1,750	1,220	689	468	820
25	556	535	407	275	510	1,880	2,070	1,820	2,090	1,530	790	570	1,000
20	688	622	475	360	600	2,160	2,520	2,150	2,560	1,920	930	719	1,250
15	822	765	550	460	798	2,530	3,390	2,780	3,140	2,570	1,100	944	1,600
10	1,090	1,020	700	540	1,090	3,400	4,790	3,450	4,110	3,090	1,380	1,320	2,230
5	1,730	1,480	1,140	820	1,800	5,040	7,360	4,600	6,720	4,040	2,020	2,320	3,490

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 71 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,050
0.90	1.11	2,690
0.80	1.25	3,720
0.50	2	6,790
0.20	5	12,200
0.10	10	16,300
0.04	25	22,300
0.02	50	27,100
0.01	100	32,300
0.005	200	37,800

Magnitude and frequency of annual high discharges, based on period of record 1919-24, 1929-31, 1937-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	592	451	281	196
0.95	1.05	1,150	902	628	465
0.90	1.11	1,620	1,290	936	709
0.80	1.25	2,420	1,950	1,480	1,140
0.50	2	4,990	4,130	3,290	2,550
0.20	5	9,780	8,300	6,610	5,000
0.10	10	13,600	11,700	9,170	6,770
0.04	25	19,200	16,600	12,700	9,040
0.02	50	23,700	20,700	15,400	10,700
0.01	100	28,500	25,100	18,100	12,300
0.005	200	33,600	29,700	20,900	13,900

06606600 LITTLE SIOUX RIVER AT CORRECTIONVILLE, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1919 to March 1925, April 1929 to March 1932, April 1937 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.5	3.8	4.4	5.2	6.0	8.6	12	14	14
0.02	50	5.1	5.4	6.2	7.2	8.2	11	16	19	20
0.05	20	8.6	9.1	10	11	13	18	24	29	33
0.10	10	14	14	15	17	20	26	35	43	51
0.20	5	23	24	26	28	32	42	56	68	85
0.50	2	61	64	67	71	81	102	135	162	216
0.80	1.25	151	161	168	178	202	250	321	382	517
0.90	1.11	237	256	269	286	323	398	504	594	796
0.96	1.04	376	414	440	471	530	655	812	945	1,240
0.98	1.02	501	560	603	649	727	902	1,100	1,270	1,640
0.99	1.01	644	731	798	865	965	1,200	1,450	1,660	2,090

Magnitude and frequency of seasonal low discharges, based on period of record July 1918 to June 1925, October 1928 to June 1932, July 1936 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	5.4	5.6	5.9	7.3	13	18	22	36
0.02	50	7.7	7.8	8.2	10	20	28	33	52
0.05	20	13	13	14	16	39	51	59	88
0.10	10	20	20	21	25	68	84	97	138
0.20	5	33	34	35	41	127	150	172	232
0.50	2	85	88	92	106	361	406	459	586
0.80	1.25	209	219	231	270	861	955	1,080	1,350
0.90	1.11	330	346	371	436	1,270	1,420	1,600	2,020
0.96	1.04	528	556	606	723	1,840	2,080	2,360	3,030
0.98	1.02	710	750	828	999	2,270	2,610	2,980	3,890
0.99	1.01	922	977	1,090	1,330	2,710	3,160	3,620	4,820
		July-August-September				October-November-December			
0.01	100	3.0	6.0	7.9	11	4.7	6.2	7.0	8.8
0.02	50	4.9	8.8	11	15	6.9	8.9	10	12
0.05	20	9.9	15	19	25	12	15	17	21
0.10	10	18	25	30	39	20	24	27	32
0.20	5	36	45	51	67	34	41	46	54
0.50	2	117	128	142	185	91	109	121	144
0.80	1.25	327	346	380	496	221	271	306	363
0.90	1.11	526	568	628	823	339	426	484	580
0.96	1.04	836	944	1,060	1,400	520	678	778	944
0.98	1.02	1,100	1,300	1,490	1,970	676	906	1,050	1,280
0.99	1.01	1,390	1,720	2,000	2,670	847	1,170	1,360	1,680

06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA

LOCATION.—Lat 42°04'50", long 96°00'50", in SE1/4 SW1/4 sec. 18, T84N, R44W, Monona County, Hydrologic Unit 10230003, near left bank on downstream side of pier of bridge on county highway, 1.1 mi south of Kennebec, 1.2 mi downstream from Gard Creek, 5.5 mi northeast of Onawa, 6.2 mi upstream from Maple River, and at mile 22.0.

DRAINAGE AREA.—2,738 mi^2.

PERIOD OF RECORD.—April 1939 to September 1969 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,027.02 ft above sea level (Monona County Highway Department benchmark). Prior to May 24, 1950, nonrecording gage and May 24, 1950 to October 12, 1959, water-stage recorder at same site at datum 0.87 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 29,700 ft^3/s, April 8, 1965, gage height, 26.50 ft; maximum gage height, 26.63 ft, June 21, 1954, before levees failed in vicinity of gage; minimum daily discharge, 11 ft^3/s, October 11, 1956.

Selected values from rating table number 5, developed October 1967
(A discharge measurement to validate this rating has not been made since September 1969)

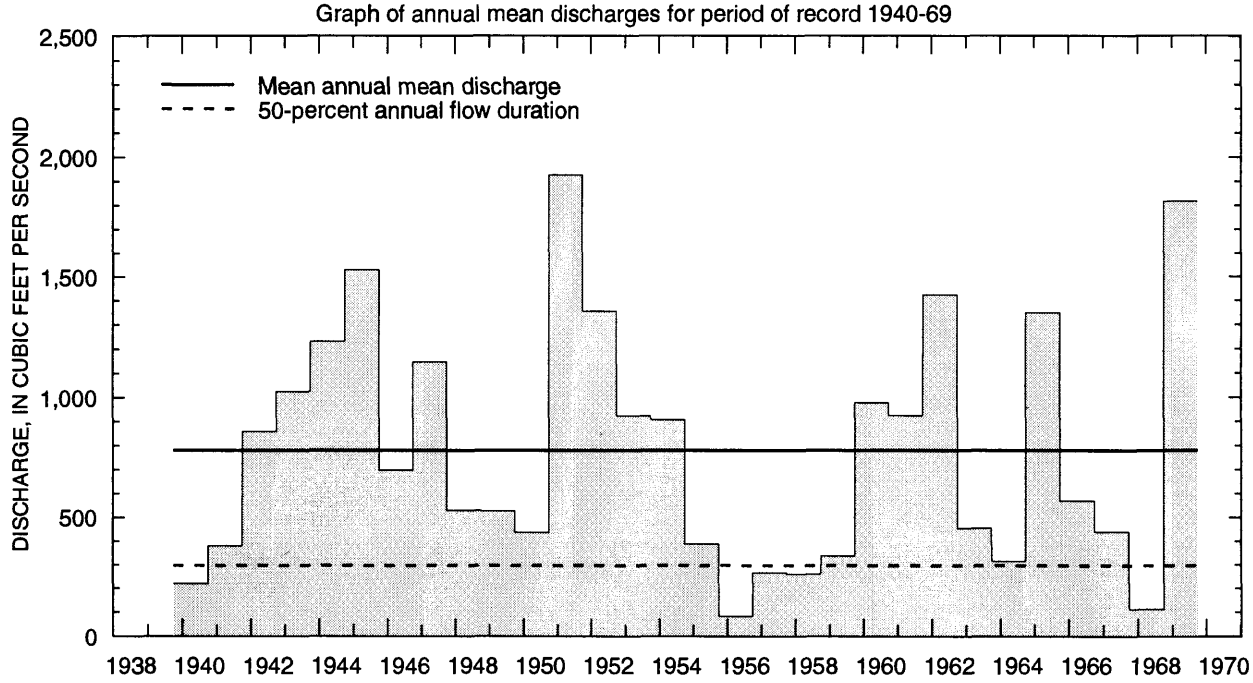
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	45	10.0	1,390
6.5	133	12.0	2,500
7.0	250	13.0	3,100
8.0	558	15.0	4,500
9.0	940		

06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1940-69

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,219	1952	17.9	1957	328	319
November	735	1952	38.5	1959	267	207
December	668	1952	24.9	1959	197	151
January	577	1952	19.0	1959	147	119
February	1,793	1946	20.1	1959	423	495
March	3,873	1961	115	1968	1,270	992
April	9,371	1965	109	1968	1,910	2,444
May	3,108	1951	74.2	1968	1,064	847
June	5,115	1954	89.2	1956	1,614	1,342
July	4,118	1969	69.3	1956	1,100	1,119
August	2,758	1951	57.0	1956	580	630
September	2,782	1951	29.5	1958	460	578
Annual	1,926	1951	82.5	1956	780	510

Graph of annual mean discharges for period of record 1940-69



06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA—Continued

Monthly and annual flow durations, based on period of record 1940-69

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	13	34	22	18	18	50	99	64	43	43	37	23	20
95	23	45	35	22	26	75	136	115	163	86	48	30	37
90	48	64	45	27	29	110	209	193	226	126	65	45	60
85	62	80	55	35	35	125	287	234	260	153	97	71	80
80	68	89	65	44	50	175	345	293	312	184	116	84	102
75	89	95	71	52	64	210	431	363	396	228	135	102	125
70	106	102	83	64	75	270	514	416	510	268	150	118	145
60	142	146	120	107	96	500	651	554	723	350	202	146	203
50	186	217	150	130	140	704	821	730	960	530	273	201	296
40	261	263	180	140	190	1,020	1,070	910	1,280	797	396	293	436
30	366	334	234	160	270	1,470	1,530	1,200	1,680	1,150	545	402	664
25	441	380	260	175	400	1,770	1,860	1,350	2,000	1,420	710	510	840
20	547	440	300	180	566	2,000	2,260	1,560	2,380	1,870	872	681	1,040
15	623	498	350	209	866	2,260	3,020	1,760	3,040	2,580	1,110	892	1,380
10	770	564	444	290	1,200	2,570	4,590	2,140	3,630	3,140	1,360	1,200	1,880
5	1,120	715	533	400	1,940	3,790	8,090	3,130	5,530	3,930	1,920	1,700	3,000

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 30 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,340
0.90	1.11	3,100
0.80	1.25	4,290
0.50	2	7,710
0.20	5	13,200
0.10	10	17,200
0.04	25	22,400
0.02	50	26,400
0.01	100	30,500
0.005	200	34,600

Magnitude and frequency of annual high discharges, based on period of record 1940-69

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	382	329	227	158
0.95	1.05	958	774	553	406
0.90	1.11	1,490	1,180	858	641
0.80	1.25	2,460	1,930	1,420	1,070
0.50	2	5,640	4,480	3,360	2,510
0.20	5	11,200	9,330	7,100	5,090
0.10	10	15,100	13,200	10,000	6,950
0.04	25	20,000	18,400	14,000	9,320
0.02	50	23,500	22,500	17,100	11,000
0.01	100	26,800	26,700	20,300	12,700
0.005	200	31,000	31,000	23,500	14,200

06606700 LITTLE SIOUX RIVER NEAR KENNEBEC, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	9.6	10	11	11	12	14	16	18	18
0.02	50	12	12	13	14	15	18	21	24	24
0.05	20	17	17	18	19	21	26	31	35	38
0.10	10	22	23	24	25	29	36	43	49	56
0.20	5	32	32	33	35	41	51	64	72	89
0.50	2	60	61	63	67	78	99	126	145	197
0.80	1.25	112	116	118	123	145	182	234	274	397
0.90	1.11	154	161	163	168	196	247	315	374	554
0.96	1.04	216	227	229	234	268	336	423	512	768
0.98	1.02	267	283	285	288	326	408	508	622	937
0.99	1.01	322	345	346	347	387	483	593	736	1,110

Magnitude and frequency of seasonal low discharges, based on period of record July 1939 to September 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	11	11	11	12	25	29	33	48
0.02	50	14	14	14	15	35	41	46	65
0.05	20	20	20	20	21	57	67	75	102
0.10	10	26	27	28	30	86	100	112	150
0.20	5	38	39	40	44	138	160	179	234
0.50	2	73	76	79	90	315	360	403	513
0.80	1.25	137	141	148	182	646	725	817	1,040
0.90	1.11	186	192	201	260	904	1,000	1,140	1,470
0.96	1.04	257	262	274	378	1,260	1,380	1,570	2,070
0.98	1.02	314	319	333	480	1,530	1,670	1,910	2,560
0.99	1.01	375	378	394	593	1,820	1,960	2,250	3,070
		July-August-September				October-November-December			
0.01	100	11	13	15	21	9.6	10	11	13
0.02	50	14	16	19	25	13	14	15	18
0.05	20	21	24	27	36	21	22	24	28
0.10	10	30	34	38	49	30	32	34	40
0.20	5	47	52	57	73	46	49	52	62
0.50	2	112	121	132	170	93	103	111	133
0.80	1.25	268	291	322	432	166	199	216	264
0.90	1.11	425	466	526	730	214	271	296	366
0.96	1.04	699	781	903	1,310	272	368	404	508
0.98	1.02	966	1,100	1,290	1,950	312	442	488	621
0.99	1.01	1,290	1,490	1,800	2,820	350	516	573	737

06607000 ODEBOLT CREEK NEAR ARTHUR, IOWA

LOCATION.—Lat 42°20'10", long 95°22'52", in SE1/4 NE1/4 sec. 21, T87N, R39W, Ida County, Hydrologic Unit 10230005, near center of span on downstream side of bridge on County Highway M27, 700 ft south of State Highway 175, 1.0 mi downstream from Hoskins Creek, 1.8 mi west of Arthur, 4.6 mi southeast of Ida Grove and 6.5 mi upstream from mouth.

DRAINAGE AREA.—39.3 mi^2.

PERIOD OF RECORD.—October 1957 to September 1975 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,258.57 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 5,200 ft^3/s, August 30, 1962, gage height, 13.78 ft; maximum gage height, 14.11 ft, March 31, 1965, backwater from ice; minimum daily discharge, 0.2 ft^3/s, January 2–February 27, 1959.

Selected values from rating table number 8, developed January 1973
(A discharge measurement to validate this rating has not been made since August 1976)

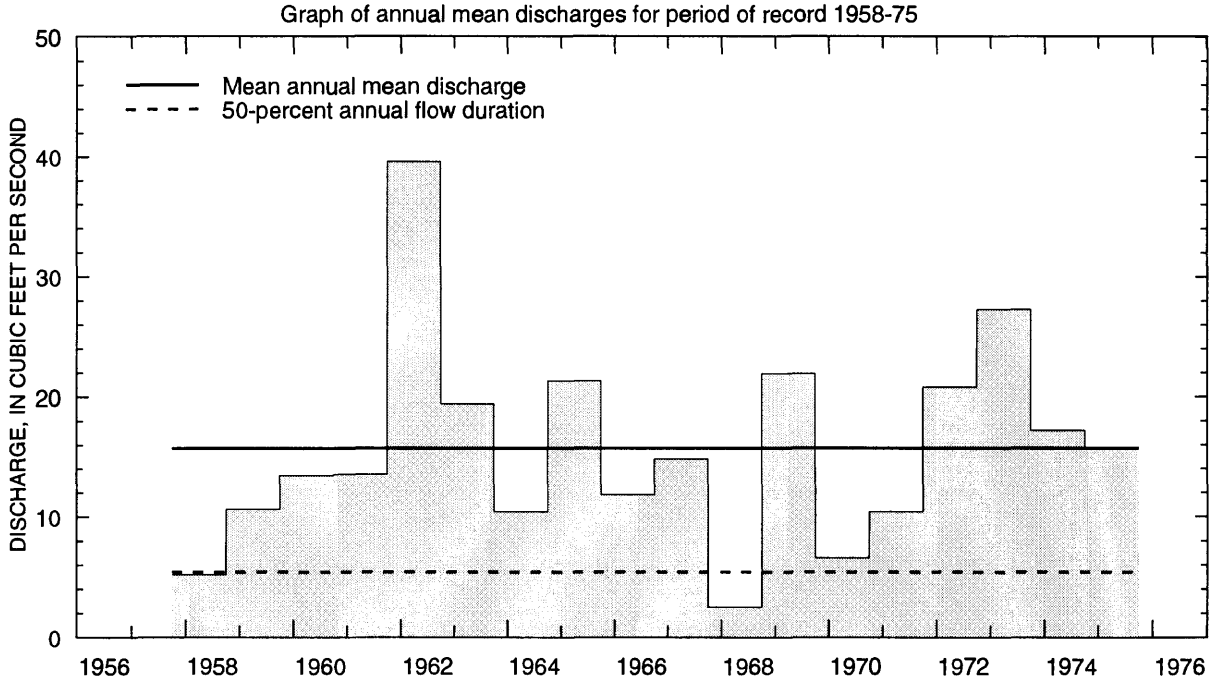
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	13	5.0	290
3.0	45	6.0	461
3.5	91	7.0	660
4.0	146	8.0	892
4.5	200	10.0	1,460

06607000 ODEBOLT CREEK NEAR ARTHUR, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1958-75

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	29.4	1963	0.85	1959	7.83	8.58
November	29.8	1973	0.81	1959	6.90	7.78
December	17.8	1973	0.33	1959	4.66	4.74
January	30.9	1973	0.20	1959	4.62	7.09
February	47.2	1971	0.20	1959	11.7	11.8
March	122	1962	2.82	1968	33.2	32.0
April	103	1965	2.90	1968	24.2	27.4
May	78.0	1959	1.83	1968	26.3	20.1
June	120	1967	5.99	1968	30.5	27.2
July	65.3	1972	1.47	1968	15.2	15.1
August	143	1962	1.45	1971	14.5	32.6
September	51.5	1962	1.20	1971	8.63	12.6
Annual	39.6	1962	2.47	1968	15.7	8.73

Graph of annual mean discharges for period of record 1958-75



06607000 ODEBOLT CREEK NEAR ARTHUR, IOWA—Continued

Monthly and annual flow durations, based on period of record 1958-75

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.80	0.64	0.30	0.20	0.20	0.80	2.0	1.4	1.2	0.94	0.72	0.90	0.30
95	0.90	1.0	0.40	0.20	0.20	2.5	2.6	1.7	3.1	2.0	1.2	1.0	0.90
90	1.0	1.7	1.0	0.60	0.84	2.6	3.3	2.2	4.2	2.8	1.4	1.2	1.3
85	1.5	2.0	1.3	0.83	0.90	3.0	4.2	3.5	5.3	3.4	1.7	1.4	1.8
80	1.9	2.2	1.5	1.0	1.3	3.5	5.4	5.2	6.6	4.0	2.5	1.7	2.2
75	2.3	2.3	1.7	1.2	1.7	4.3	6.1	6.7	10	5.6	3.2	2.5	2.6
70	2.6	2.4	1.8	1.2	1.9	5.3	7.1	8.2	12	6.8	3.5	2.8	2.9
60	2.8	2.8	2.1	2.0	2.5	6.3	9.2	12	14	8.8	4.6	3.3	3.9
50	3.3	3.2	2.5	2.5	3.1	7.8	13	15	18	10	5.4	4.0	5.4
40	4.1	3.9	3.1	2.8	3.8	12	16	18	22	12	6.3	4.3	8.2
30	5.7	6.1	4.6	3.9	8.2	19	19	23	27	14	7.4	4.9	12
25	8.7	8.6	5.3	4.7	10	24	21	28	30	16	8.2	5.6	15
20	14	12	7.9	5.1	15	36	25	32	34	18	9.3	7.0	18
15	18	14	9.6	6.7	17	58	32	38	40	20	11	13	22
10	22	17	11	9.6	21	73	40	47	53	23	13	21	29
5	29	21	14	21	41	115	56	75	98	34	20	38	48

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 18 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	126
0.95	1.05	234
0.90	1.11	324
0.80	1.25	478
0.50	2	990
0.20	5	2,010
0.10	10	2,890
0.04	25	4,220
0.02	50	5,380
0.01	100	6,670
0.005	200	8,120

Magnitude and frequency of annual high discharges, based on period of record 1958-75

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	23	12	7.9	4.6
0.95	1.05	46	28	18	12
0.90	1.11	66	41	27	19
0.80	1.25	101	65	43	30
0.50	2	222	143	92	64
0.20	5	469	288	175	111
0.10	10	684	401	233	139
0.04	25	1,010	555	307	168
0.02	50	1,300	674	359	186
0.01	100	1,610	797	410	200
0.005	200	1,960	922	458	212

06607000 ODEBOLT CREEK NEAR ARTHUR, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1975

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.13	0.13	0.13	0.14	0.15	0.18	0.23	0.37	0.58
0.02	50	0.18	0.18	0.18	0.18	0.20	0.24	0.30	0.46	0.69
0.05	20	0.25	0.26	0.27	0.29	0.32	0.38	0.47	0.65	0.91
0.10	10	0.34	0.36	0.39	0.42	0.49	0.57	0.69	0.89	1.2
0.20	5	0.50	0.54	0.60	0.65	0.78	0.92	1.1	1.3	1.7
0.50	2	1.0	1.2	1.3	1.5	1.8	2.2	2.7	3.0	3.5
0.80	1.25	2.2	2.5	2.8	3.0	3.8	5.2	6.4	7.0	8.1
0.90	1.11	3.4	3.7	4.0	4.4	5.5	8.0	10	11	13
0.96	1.04	5.3	5.6	5.9	6.3	8.0	13	16	19	23
0.98	1.02	7.2	7.4	7.6	8.0	10	17	22	27	33
0.99	1.01	9.4	9.4	9.4	9.7	12	22	29	37	46

Magnitude and frequency of seasonal low discharges, based on period of record October 1957 to September 1975

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.13	0.13	0.14	0.16	0.47	0.57	0.69	0.94
0.02	50	0.17	0.18	0.19	0.22	0.66	0.79	0.93	1.3
0.05	20	0.26	0.28	0.30	0.36	1.1	1.3	1.5	2.0
0.10	10	0.38	0.42	0.46	0.54	1.6	1.9	2.1	2.9
0.20	5	0.62	0.68	0.75	0.90	2.6	3.0	3.3	4.4
0.50	2	1.6	1.7	1.9	2.2	5.8	6.6	7.2	9.3
0.80	1.25	4.1	4.3	4.6	5.4	12	13	15	18
0.90	1.11	6.8	7.0	7.3	8.5	17	19	21	25
0.96	1.04	12	12	12	13	24	26	29	33
0.98	1.02	17	17	17	18	30	32	36	40
0.99	1.01	24	24	24	24	35	38	44	47
		July-August-September				October-November-December			
0.01	100	0.28	0.42	0.44	0.63	0.24	0.24	0.26	0.30
0.02	50	0.37	0.53	0.56	0.77	0.31	0.31	0.34	0.40
0.05	20	0.58	0.75	0.79	1.0	0.42	0.45	0.50	0.59
0.10	10	0.83	1.0	1.1	1.4	0.55	0.62	0.71	0.85
0.20	5	1.3	1.5	1.5	1.9	0.79	0.93	1.1	1.3
0.50	2	2.6	2.8	2.9	3.4	1.6	2.0	2.4	2.9
0.80	1.25	4.9	5.1	5.4	6.3	3.6	4.5	5.1	6.3
0.90	1.11	6.7	7.0	7.3	8.6	5.6	7.0	7.6	9.4
0.96	1.04	8.9	9.6	10	12	9.1	11	12	14
0.98	1.02	11	12	12	15	13	15	15	19
0.99	1.01	12	14	14	18	17	20	20	24

06607200 MAPLE RIVER AT MAPLETON, IOWA

LOCATION.—Lat 42°09'25", long 95°48'35", in SE1/4 SE1/4 sec. 23, T85N, R43W, Monona County, Hydrologic Unit 10230005, on right bank at downstream side of bridge on State Highway 175, 1.0 mi downstream from Simmons Creek, 1.1 mi southwest of intersection of State Highways 175 and 141 in Mapleton, 2.1 mi upstream from McCleery Creek, and 16.0 mi upstream from mouth.

DRAINAGE AREA.—669 mi^2.

PERIOD OF RECORD.—October 1941 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,085.86 ft above sea level. See WSP 1730 for history of changes prior to September 20, 1956.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 20,800 ft^3/s, September 12, 1978, gage height 16.74 ft; maximum gage height, 22.10 ft; June 12, 1950; no flow September 21–22, 1945, caused by temporary dam upstream.

Selected values from rating table number 21, developed October 1993

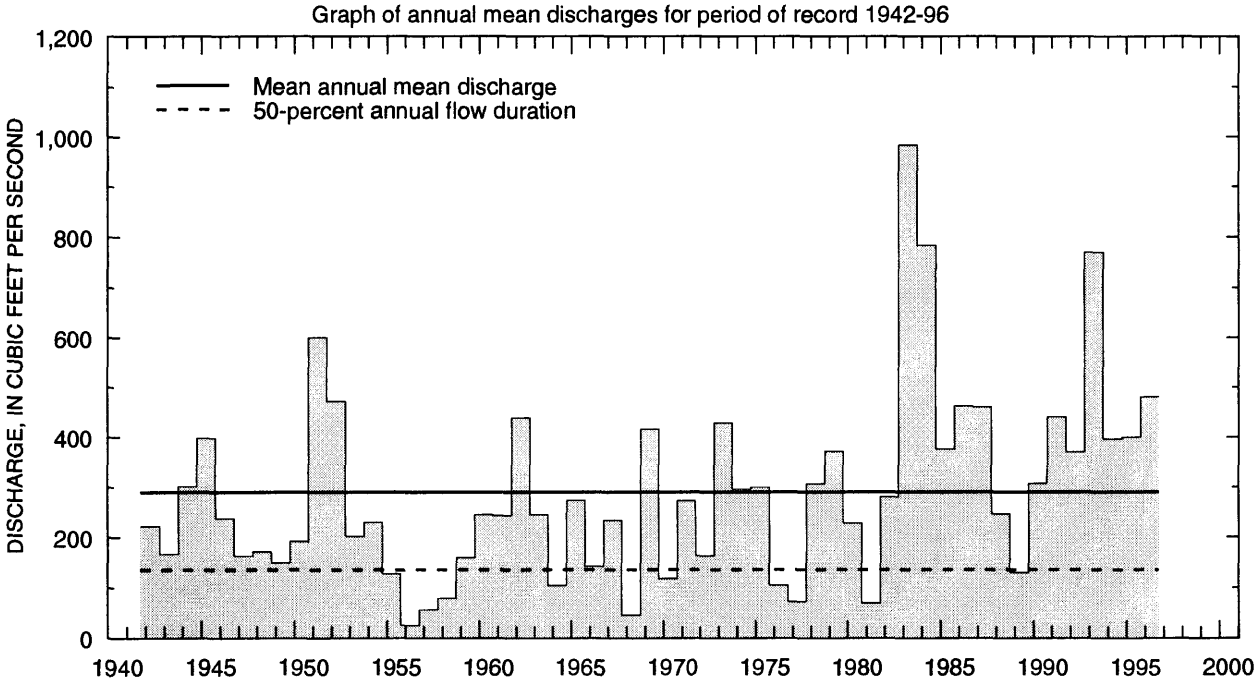
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
0.5	50.5	8.0	5,230
1.0	161	10.0	7,600
2.0	510	12.0	10,200
3.0	1,010	14.0	14,000
4.0	1,630	16.8	21,000
6.0	3,220		

06607200 MAPLE RIVER AT MAPLETON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1942-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	634	1983	9.36	1957	158	146
November	506	1993	14.6	1959	145	126
December	548	1985	5.74	1959	116	112
January	330	1983	3.25	1959	93.7	93.2
February	1,016	1971	3.64	1959	220	232
March	1,588	1983	25.6	1957	502	436
April	1,889	1983	19.9	1957	409	431
May	1,345	1984	35.9	1968	396	321
June	2,856	1984	48.5	1955	638	631
July	1,588	1993	33.3	1956	363	317
August	1,230	1951	12.6	1956	256	252
September	1,034	1951	5.48	1956	184	192
Annual	983	1983	24.5	1956	290	190

Graph of annual mean discharges for period of record 1942-96



06607200 MAPLE RIVER AT MAPLETON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1942-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.2	11	5.5	3.4	2.7	18	19	13	9.8	11	9.1	5.0	6.0
95	22	21	14	6.0	8.0	30	40	34	39	41	27	22	18
90	30	33	20	11	13	50	57	50	70	54	36	27	28
85	37	40	24	16	20	62	71	70	98	69	46	34	38
80	42	44	29	20	26	79	87	85	121	82	53	43	46
75	45	47	35	25	35	92	106	101	143	100	66	51	57
70	54	54	40	28	39	115	118	123	170	116	80	60	69
60	74	74	55	37	60	163	165	171	229	157	104	80	98
50	98	96	74	46	90	215	220	212	316	214	137	109	135
40	117	112	96	66	145	288	281	295	421	296	178	138	189
30	175	169	130	110	190	380	384	430	529	387	235	191	254
25	220	198	150	140	220	471	486	507	611	450	268	210	300
20	258	235	180	170	266	582	600	621	711	533	330	251	365
15	297	279	215	200	330	761	709	747	884	631	410	305	462
10	374	348	280	240	500	1,080	863	934	1,240	776	520	357	613
5	466	438	350	300	800	2,000	1,260	1,290	2,180	1,090	703	531	943

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 55 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,060
0.95	1.05	1,950
0.90	1.11	2,640
0.80	1.25	3,740
0.50	2	6,910
0.20	5	11,900
0.10	10	15,400
0.04	25	19,900
0.02	50	23,200
0.01	100	26,400
0.005	200	29,700

Magnitude and frequency of annual high discharges, based on period of record 1942-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	237	146	91	67
0.95	1.05	554	345	225	169
0.90	1.11	840	525	349	260
0.80	1.25	1,340	844	567	419
0.50	2	2,980	1,900	1,260	901
0.20	5	5,840	3,760	2,410	1,630
0.10	10	7,910	5,130	3,180	2,080
0.04	25	10,600	6,920	4,120	2,590
0.02	50	12,600	8,240	4,760	2,920
0.01	100	14,500	9,540	5,360	3,210
0.005	200	16,300	10,800	5,900	3,460

06607200 MAPLE RIVER AT MAPLETON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1942 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	2.1	2.1	2.1	2.4	3.4	4.6	6.6	8.3
0.02	50	0.80	2.9	3.0	3.1	3.5	4.8	6.5	8.9	11
0.05	20	3.4	4.8	5.0	5.2	6.0	8.0	11	14	18
0.10	10	5.8	7.5	7.8	8.2	9.5	12	16	20	26
0.20	5	10	12	13	14	16	21	26	32	41
0.50	2	28	31	34	37	42	52	64	72	92
0.80	1.25	67	74	81	89	103	124	144	160	196
0.90	1.11	103	112	125	138	158	189	213	238	285
0.96	1.04	160	173	194	216	244	291	318	360	418
0.98	1.02	210	227	254	285	320	381	407	468	531
0.99	1.01	268	287	321	363	404	481	505	590	654

Magnitude and frequency of seasonal low discharges, based on period of record October 1941 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.0	2.1	2.1	2.3	5.4	7.3	8.7	16
0.02	50	2.8	3.0	3.1	3.4	8.1	11	13	21
0.05	20	4.8	5.2	5.4	6.1	15	18	21	32
0.10	10	7.5	8.4	8.7	9.9	24	29	33	46
0.20	5	13	15	15	18	42	49	55	71
0.50	2	34	39	42	49	111	123	138	164
0.80	1.25	88	99	108	127	252	282	315	371
0.90	1.11	140	157	172	201	366	419	467	565
0.96	1.04	227	250	277	321	524	620	692	881
0.98	1.02	308	334	374	428	648	788	881	1,170
0.99	1.01	403	430	486	550	775	967	1,080	1,510
		July-August-September				October-November-December			
0.01	100	0.00	6.5	7.1	8.0	3.5	4.1	4.6	5.9
0.02	50	2.3	8.9	9.7	11	4.8	5.7	6.4	8.2
0.05	20	8.9	14	15	18	7.6	9.1	10	13
0.10	10	15	21	23	27	11	14	15	19
0.20	5	27	33	36	43	18	22	24	31
0.50	2	66	74	80	99	41	51	58	72
0.80	1.25	143	156	168	206	87	112	128	154
0.90	1.11	206	223	240	294	126	165	189	223
0.96	1.04	295	322	344	417	185	244	283	324
0.98	1.02	367	404	430	517	234	311	363	408
0.99	1.01	443	491	521	621	288	385	451	499

06607500 LITTLE SIOUX RIVER NEAR TURIN, IOWA

LOCATION.—Lat 41°57'52", long 95°58'21", in NW1/4 NE1/4 sec. 33, T83N, R44W, Monona County, Hydrologic Unit 10230003, on left bank on downstream side of bridge on County Highway E54, 1.0 mi east of gaging station of Monona Harrison Ditch near Turin, 2.5 mi downstream from Maple River, 3.8 mi south of Turin, 6.2 mi northeast of Blencoe, and at mile 13.5.

DRAINAGE AREA.—3,526 mi^2.

PERIOD OF RECORD.—May 1942 to September 1957, January 1958 to September 1996. June 1942 to January 1958 at site 1,200 ft east on old river channel. Streamflows affected by diversion into Monona-Harrison Ditch through equalizer ditch 1.5 mi upstream 1923 to 1958, and occasional diversions to and from Monona-Harrison Ditch through diversion ditch 8.3 miles upstream since 1958.

GAGE.—Water-stage recorder. Datum of gage is 1,019.85 ft above sea level (U.S. Army Corps of Engineers benchmark). Prior to July 15, 1958, nonrecording gage near present site at different datums. July 15 to September 3, 1958, nonrecording gage at present site and datum.

EXTREMES FOR PERIOD OF RECORD.—Since 1958: maximum instantaneous discharge, 32,000 ft^3/s, June 22, 1996, gage height, 26.99 ft; maximum gage height, 27.44 ft, February 19, 1971, backwater from ice; minimum daily discharge, 17 ft^3/s, January 18–20, 28–February 1, 1977.

REMARKS.—Statistics computed for record collected since February 1958.

Selected values from rating table number 20, developed October 1995

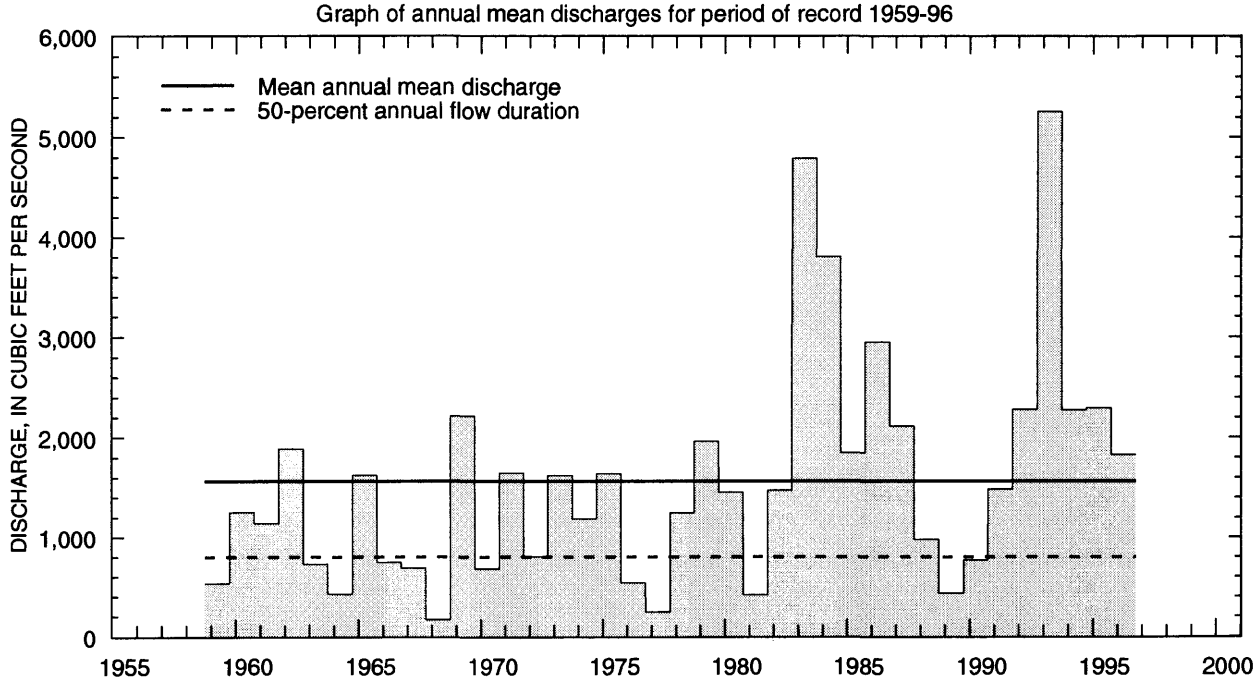
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.5	213	15.0	6,690
6.0	359	18.0	9,600
7.0	749	21.0	14,800
8.0	1,260	24.0	22,400
9.0	1,890	27.0	32,000
12.0	4,180		

06607500 LITTLE SIOUX RIVER NEAR TURIN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	3,625	1983	37.5	1959	851	870
November	3,612	1980	48.0	1959	847	843
December	2,424	1983	31.2	1959	676	639
January	2,250	1992	18.5	1977	485	496
February	3,353	1971	25.1	1959	834	874
March	9,054	1983	171	1964	2,422	2,027
April	10,790	1965	157	1968	3,200	3,027
May	7,938	1986	118	1968	2,395	1,913
June	15,080	1984	315	1968	2,982	2,978
July	13,110	1993	181	1968	2,089	2,428
August	5,181	1993	140	1976	1,073	974
September	3,980	1993	90.2	1976	904	871
Annual	5,261	1993	167	1968	1,564	1,144

Graph of annual mean discharges for period of record 1959-96



06607500 LITTLE SIOUX RIVER NEAR TURIN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	36	46	30	18	22	110	133	101	103	140	89	84	33
95	112	109	56	26	54	150	256	202	323	199	144	116	104
90	129	138	88	70	90	190	323	325	457	259	180	146	145
85	154	170	120	100	120	250	405	491	601	320	213	169	182
80	188	230	162	120	130	318	490	730	789	388	255	193	233
75	253	270	200	130	150	440	722	868	968	441	310	231	292
70	292	298	220	150	160	639	1,120	989	1,160	521	372	296	350
60	366	346	280	190	230	987	1,470	1,250	1,460	755	508	403	525
50	430	478	400	270	380	1,390	1,860	1,530	1,760	1,070	650	546	800
40	719	764	600	394	600	1,930	2,330	2,080	2,100	1,570	929	754	1,090
30	1,040	969	830	650	760	2,520	3,260	2,780	2,690	2,140	1,220	1,040	1,500
25	1,120	1,090	922	720	860	3,060	4,110	3,400	3,200	2,590	1,370	1,140	1,780
20	1,250	1,280	1,050	800	1,100	3,660	5,070	4,080	3,840	3,260	1,600	1,300	2,160
15	1,510	1,620	1,300	900	1,300	4,460	6,430	4,620	4,790	3,770	1,850	1,600	2,720
10	2,090	2,070	1,700	1,200	1,900	5,630	8,080	5,510	6,870	4,580	2,280	2,170	3,740
5	2,820	2,730	2,200	1,450	2,880	8,070	10,700	7,350	11,000	7,350	3,460	2,980	5,730

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 39 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,640
0.95	1.05	3,260
0.90	1.11	4,580
0.80	1.25	6,750
0.50	2	13,200
0.20	5	23,500
0.10	10	30,800
0.04	25	40,000
0.02	50	46,800
0.01	100	53,400
0.005	200	59,800

[a] Analysis includes only peak discharges for the period 1958-96.

Magnitude and frequency of annual high discharges, based on period of record 1959-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	945	745	510	364
0.95	1.05	2,020	1,590	1,140	851
0.90	1.11	2,940	2,310	1,690	1,280
0.80	1.25	4,490	3,530	2,640	2,030
0.50	2	9,280	7,350	5,650	4,370
0.20	5	17,200	13,800	10,800	8,170
0.10	10	22,900	18,500	14,600	10,800
0.04	25	30,000	24,600	19,400	13,900
0.02	50	35,200	29,100	22,900	16,200
0.01	100	40,300	33,600	26,400	18,200
0.005	200	45,200	38,000	29,800	20,200

06607500 LITTLE SIOUX RIVER NEAR TURIN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	12	12	13	14	15	18	24	30	34
0.02	50	17	17	18	19	21	26	33	41	48
0.05	20	27	28	29	31	35	42	54	66	79
0.10	10	41	43	45	48	53	65	82	98	120
0.20	5	67	70	74	78	88	106	133	156	196
0.50	2	164	171	180	192	220	263	321	368	468
0.80	1.25	377	395	413	444	510	611	731	823	1,030
0.90	1.11	569	598	622	672	771	926	1,100	1,230	1,500
0.96	1.04	868	913	944	1,030	1,170	1,420	1,660	1,860	2,190
0.98	1.02	1,130	1,190	1,230	1,340	1,520	1,840	2,150	2,410	2,770
0.99	1.01	1,420	1,500	1,540	1,680	1,910	2,320	2,700	3,020	3,380

Magnitude and frequency of seasonal low discharges, based on period of record April 1958 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	13	13	14	15	55	62	72	83
0.02	50	18	19	20	21	76	86	99	116
0.05	20	31	32	33	36	123	139	158	188
0.10	10	48	50	51	57	185	209	234	284
0.20	5	81	84	87	97	298	335	373	459
0.50	2	206	216	226	254	704	784	863	1,080
0.80	1.25	486	514	552	621	1,550	1,700	1,870	2,360
0.90	1.11	739	785	860	965	2,290	2,490	2,740	3,430
0.96	1.04	1,130	1,210	1,360	1,510	3,390	3,650	4,050	5,010
0.98	1.02	1,470	1,580	1,800	2,000	4,330	4,620	5,150	6,320
0.99	1.01	1,850	1,990	2,310	2,560	5,350	5,680	6,360	7,740
		July-August-September				October-November-December			
0.01	100	28	34	38	46	16	20	22	27
0.02	50	38	44	50	60	23	28	31	37
0.05	20	57	66	73	89	38	45	50	60
0.10	10	83	94	104	125	58	68	77	91
0.20	5	129	144	158	191	95	111	126	148
0.50	2	297	322	352	426	234	272	310	361
0.80	1.25	667	714	776	952	534	639	728	831
0.90	1.11	1,010	1,080	1,170	1,450	799	982	1,120	1,260
0.96	1.04	1,550	1,660	1,810	2,270	1,200	1,530	1,730	1,930
0.98	1.02	2,050	2,200	2,390	3,030	1,550	2,030	2,280	2,530
0.99	1.01	2,620	2,820	3,070	3,930	1,940	2,600	2,910	3,200

06608500 SOLDIER RIVER AT PISGAH, IOWA

LOCATION.—Lat 41°49'50", long 95°55'52", in NW1/4 NE1/4 sec. 14, T81N, R44W, Harrison County, Hydrologic Unit 10230001, on right bank at upstream side of bridge on County Highway F20, at west edge of Pisgah, 0.4 mi downstream from Cobb Creek, 0.5 mi upstream from Mogger Ditch, and 13.1 mi upstream from mouth.

DRAINAGE AREA.—407 mi^2.

PERIOD OF RECORD.—March 1940 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,036.53 ft above sea level. Prior to October 11, 1954, nonrecording gage at same site and datum with supplementary water-stage recorder operating above 8.2 ft gage height March 2, 1946 to September 24, 1953. Prior to February 1954, on left bank at downstream side of bridge. Prior to June 21, 1989, at site 100 ft downstream at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 34,700 ft^3/s, July 17, 1996, gage height, 28.87 ft; minimum daily discharge, 2.0 ft^3/s, January 2–10, 1945.

Selected values from rating table number 15, developed October 1995

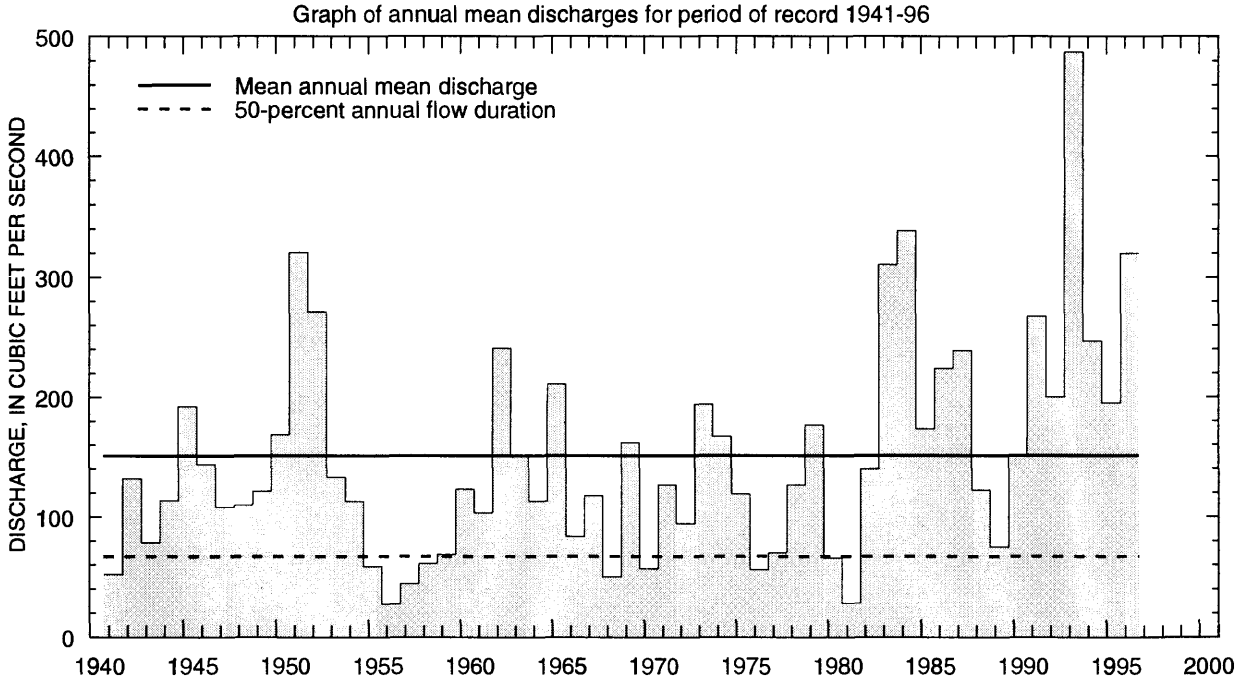
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.5	35.3	12.0	4,190
4.0	105	15.0	6,840
5.0	323	18.0	10,000
6.0	645	21.0	13,800
8.0	1,540	24.0	19,800
10.0	2,730	28.0	30,000

06608500 SOLDIER RIVER AT PISGAH, IOWA —Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1941-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	330	1994	9.61	1957	78.0	67.1
November	274	1994	12.8	1959	72.1	57.0
December	281	1985	6.05	1959	64.5	61.2
January	431	1952	3.29	1959	63.7	72.4
February	653	1971	9.43	1956	149	125
March	897	1993	27.8	1957	274	238
April	623	1983	12.5	1957	162	148
May	555	1984	13.6	1957	195	147
June	1,233	1991	22.1	1956	305	278
July	1,607	1993	22.8	1970	194	250
August	632	1993	14.4	1971	141	139
September	482	1978	6.70	1956	111	112
Annual	487	1993	27.3	1956	151	91.0

Graph of annual mean discharges for period of record 1941-96



06608500 SOLDIER RIVER AT PISGAH, IOWA —Continued

Monthly and annual flow durations, based on period of record 1941-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.4	9.6	5.0	3.0	4.0	20	9.2	6.4	7.2	8.1	8.0	6.0	5.7
95	11	13	8.0	5.0	8.0	29	21	16	14	17	10	10	10
90	12	17	11	7.0	12	38	28	23	29	21	15	13	15
85	16	20	15	9.9	21	45	35	33	37	26	19	15	21
80	20	24	17	11	28	54	41	40	44	31	24	20	28
75	25	28	20	15	31	63	46	46	53	41	31	27	32
70	29	32	25	18	35	72	53	54	63	52	37	30	38
60	38	41	33	30	45	90	71	70	100	73	50	40	50
50	47	50	42	35	60	120	99	91	135	92	64	53	67
40	57	63	55	45	92	151	124	128	169	115	82	68	90
30	86	84	72	68	120	190	162	189	216	147	110	95	123
25	101	97	80	80	140	216	184	219	242	174	129	115	145
20	118	110	94	93	160	270	217	269	297	211	148	138	169
15	139	135	110	110	200	364	264	334	382	261	186	166	207
10	163	154	138	132	276	581	323	418	560	328	259	213	280
5	209	189	180	170	500	1,100	462	598	1,150	588	402	320	456

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 57 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,340
0.95	1.05	2,410
0.90	1.11	3,250
0.80	1.25	4,610
0.50	2	8,600
0.20	5	15,200
0.10	10	20,100
0.04	25	26,600
0.02	50	31,600
0.01	100	36,700
0.005	200	41,900

Magnitude and frequency of annual high discharges, based on period of record 1941-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	265	153	101	70
0.95	1.05	476	282	182	125
0.90	1.11	645	386	246	169
0.80	1.25	926	557	349	239
0.50	2	1,810	1,080	655	446
0.20	5	3,470	2,010	1,170	792
0.10	10	4,810	2,720	1,560	1,050
0.04	25	6,770	3,710	2,080	1,390
0.02	50	8,420	4,500	2,490	1,660
0.01	100	10,200	5,320	2,910	1,930
0.005	200	12,100	6,190	3,350	2,210

06608500 SOLDIER RIVER AT PISGAH, IOWA —Continued

Magnitude and frequency of annual low discharges, based on period of record April 1940 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.3	1.4	1.5	2.1	3.2	4.5	6.1	7.7
0.02	50	1.8	1.8	1.9	2.2	2.9	4.2	5.8	7.7	9.7
0.05	20	2.9	3.0	3.1	3.5	4.5	6.5	8.6	11	14
0.10	10	4.4	4.6	4.8	5.4	6.8	9.4	12	15	19
0.20	5	7.2	7.5	7.9	8.9	11	15	18	22	27
0.50	2	18	19	21	23	27	34	40	44	54
0.80	1.25	45	48	51	55	63	75	83	89	106
0.90	1.11	71	76	81	87	97	112	120	129	150
0.96	1.04	116	123	131	139	153	172	178	191	217
0.98	1.02	157	167	178	187	203	225	228	246	274
0.99	1.01	207	219	233	243	261	287	290	309	337

Magnitude and frequency of seasonal low discharges, based on period of record April 1940 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.4	1.4	1.6	2.3	2.8	3.6	4.5	6.0
0.02	50	1.9	2.0	2.3	3.3	4.0	5.0	6.3	8.3
0.05	20	3.3	3.5	3.9	5.4	6.7	8.4	10	13
0.10	10	5.2	5.6	6.1	8.4	11	13	16	20
0.20	5	8.8	9.6	11	14	18	21	25	32
0.50	2	23	26	28	35	45	52	61	76
0.80	1.25	55	62	68	81	104	116	133	168
0.90	1.11	85	96	105	122	156	172	194	246
0.96	1.04	133	149	163	186	234	254	284	364
0.98	1.02	174	194	215	242	301	323	359	464
0.99	1.01	222	245	272	304	374	398	439	572
		July-August-September				October-November-December			
0.01	100	3.0	3.6	4.7	6.8	2.5	2.8	3.3	4.8
0.02	50	3.9	4.6	5.9	8.5	3.3	3.8	4.3	6.1
0.05	20	5.9	6.9	8.5	12	5.0	5.8	6.6	8.9
0.10	10	8.5	9.7	12	16	7.2	8.3	9.4	12
0.20	5	13	15	17	24	11	13	15	18
0.50	2	31	34	38	49	25	29	32	39
0.80	1.25	72	78	85	103	53	64	70	81
0.90	1.11	112	120	130	152	78	95	103	117
0.96	1.04	180	192	208	230	117	144	155	174
0.98	1.02	244	261	282	302	152	187	200	225
0.99	1.01	322	344	373	385	191	236	251	282

06609500 BOYER RIVER AT LOGAN, IOWA

LOCATION.—Lat 41°38'33", long 95°46'57", in SE1/4 NW1/4 sec. 19, T79N, R42W, Harrison County, Hydrologic Unit 10230007, on left bank 9 ft downstream from Chicago Central and Pacific Railroad bridge at Logan, 0.4 mi downstream from Elk Grove Creek, 10.5 mi upstream from Willow Creek, and 15.8 mi upstream from mouth.

DRAINAGE AREA.—871 mi^2.

PERIOD OF RECORD.—May 1918 to November 1924, February 1925 to July 1925, November 1937 to September 1996. Monthly discharge only for some periods, published in WSP 1310.

GAGE.—Water-stage recorder. Datum of gage is 1,009.38 ft above sea level (Chicago and Northwestern Railway Company benchmark). See WSP 1918 for history of changes prior to October 18, 1960.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 30,800 ft^3/s, June 17, 1990, gage height, 22.54 ft; maximum gage height, 25.22 ft, March 1, 1965, backwater from ice; no flow September 27–29, 1918.

Selected values from rating table number 18, developed November 1992

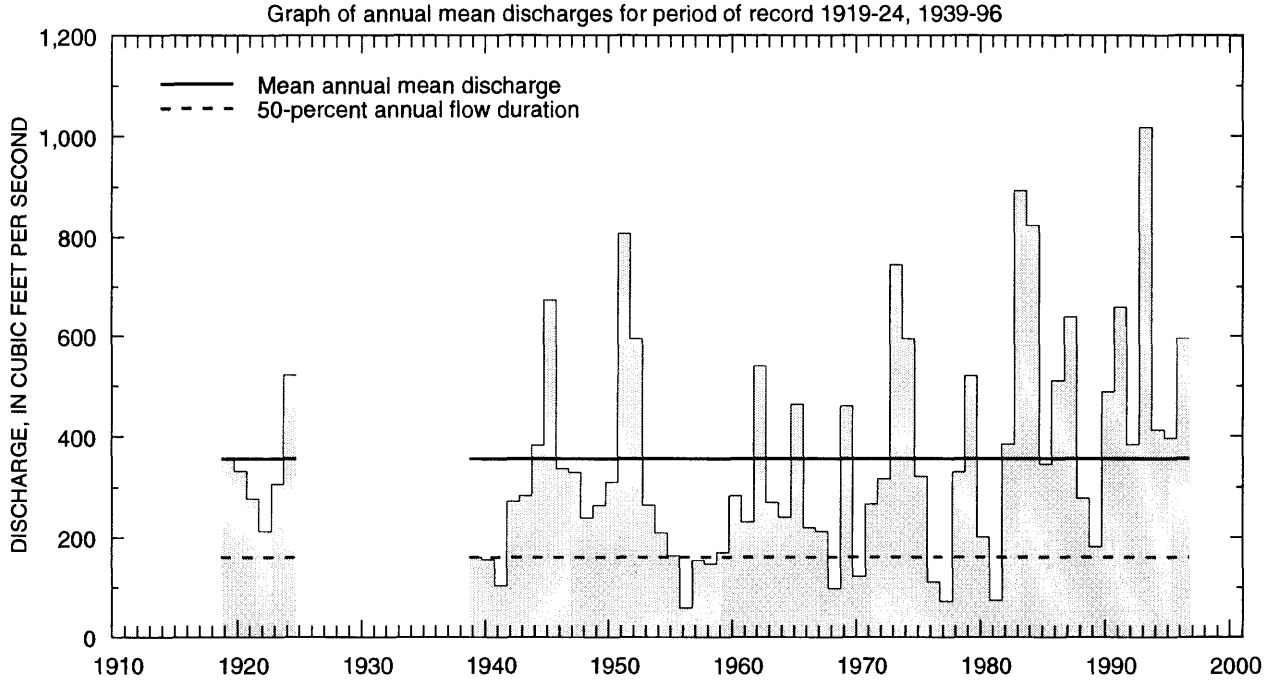
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	44.8	12.0	6,180
3.0	130	15.0	10,600
4.0	375	18.0	16,200
5.0	698	21.0	23,000
7.0	1,525	23.5	30,000
9.0	2,980		

06609500 BOYER RIVER AT LOGAN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1919-24, 1939-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	796	1974	11.1	1957	183	187
November	558	1974	8.33	1940	166	136
December	565	1973	8.13	1940	138	134
January	692	1973	3.06	1940	129	149
February	1,209	1971	3.55	1940	311	286
March	2,619	1979	40.4	1981	625	540
April	1,988	1983	23.3	1957	441	423
May	1,698	1984	39.9	1968	507	427
June	2,541	1990	33.3	1956	757	631
July	3,022	1993	51.0	1977	459	459
August	1,636	1951	34.5	1976	308	283
September	1,288	1978	11.6	1939	251	271
Annual	1,018	1993	58.7	1956	356	214

Graph of annual mean discharges for period of record 1919-24, 1939-96



06609500 BOYER RIVER AT LOGAN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1919-24, 1939-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	7.0	8.2	9.0	2.5	3.0	29	16	13	16	17	15	9.0	7.5
95	20	23	14	7.0	11	45	41	35	34	41	25	21	21
90	24	36	25	14	20	79	63	52	70	56	36	26	33
85	31	45	31	20	35	98	80	78	100	70	47	35	44
80	43	52	37	26	42	120	101	107	131	90	61	44	55
75	50	59	43	30	50	143	123	132	171	114	76	54	68
70	56	70	50	35	60	170	147	152	214	138	92	63	83
60	76	92	70	50	85	222	191	203	288	186	119	89	119
50	102	118	90	66	120	297	237	264	387	244	161	122	160
40	140	144	120	100	201	368	317	366	497	322	217	159	220
30	184	184	150	130	300	480	439	498	644	423	288	199	310
25	222	214	168	150	350	572	518	577	764	489	330	236	366
20	274	265	199	180	399	730	621	712	930	592	380	280	437
15	330	312	233	250	460	955	768	922	1,160	706	497	376	547
10	414	380	330	314	610	1,370	950	1,190	1,620	930	681	492	749
5	603	480	400	410	1,070	2,320	1,440	1,650	2,770	1,330	990	776	1,200

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 67 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	4,080
0.90	1.11	5,350
0.80	1.25	7,270
0.50	2	12,200
0.20	5	18,900
0.10	10	23,100
0.04	25	27,900
0.02	50	31,100
0.01	100	34,100
0.005	200	36,900

Magnitude and frequency of annual high discharges, based on period of record 1919-24, 1939-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	700	442	263	181
0.95	1.05	1,120	708	442	309
0.90	1.11	1,440	911	579	408
0.80	1.25	1,950	1,240	798	564
0.50	2	3,540	2,230	1,450	1,020
0.20	5	6,460	4,020	2,560	1,760
0.10	10	8,890	5,470	3,420	2,320
0.04	25	12,500	7,610	4,620	3,070
0.02	50	15,600	9,430	5,590	3,650
0.01	100	19,100	11,400	6,620	4,260
0.005	200	23,000	13,600	7,700	4,880

06609500 BOYER RIVER AT LOGAN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1919 to March 1924, April 1938 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1.3	1.3	1.6	1.9	2.5	4.1	5.6	7.7	11
0.02	50	2.0	2.1	2.5	2.9	3.8	5.9	8.0	11	15
0.05	20	3.9	4.1	4.6	5.4	6.9	10	13	17	23
0.10	10	6.7	7.0	7.8	9.0	11	16	21	26	35
0.20	5	12	13	14	16	20	27	34	41	55
0.50	2	37	38	40	45	53	68	83	94	122
0.80	1.25	93	97	101	108	126	153	182	199	248
0.90	1.11	143	149	155	164	188	224	265	286	347
0.96	1.04	217	226	237	246	278	326	385	413	485
0.98	1.02	278	289	306	313	352	408	483	516	594
0.99	1.01	343	356	380	385	429	495	587	627	707

Magnitude and frequency of seasonal low discharges, based on period of record July 1918 to September 1924, April 1925 to June 1925, January 1938 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.5	1.6	1.8	2.3	5.3	7.5	10	14
0.02	50	2.4	2.6	2.8	3.6	8.1	11	14	20
0.05	20	4.5	4.9	5.3	6.8	15	19	24	32
0.10	10	7.7	8.4	9.2	12	24	30	36	49
0.20	5	14	16	17	22	42	51	60	80
0.50	2	43	48	52	65	113	130	149	194
0.80	1.25	114	129	139	170	263	297	342	448
0.90	1.11	181	205	220	267	389	440	514	679
0.96	1.04	285	325	348	414	569	650	775	1,040
0.98	1.02	375	429	459	540	713	823	999	1,360
0.99	1.01	475	545	581	676	863	1,010	1,250	1,720
		July-August-September				October-November-December			
0.01	100	0.00	3.3	4.9	9.3	3.5	3.9	5.5	6.8
0.02	50	1.7	5.0	7.1	13	4.9	5.5	7.5	9.4
0.05	20	6.1	9.1	12	20	8.2	9.1	12	15
0.10	10	12	15	19	30	13	14	18	23
0.20	5	23	27	32	48	21	23	28	36
0.50	2	66	72	81	109	51	58	67	83
0.80	1.25	154	168	185	231	116	136	150	177
0.90	1.11	225	249	275	333	174	207	224	256
0.96	1.04	321	364	408	481	262	316	340	370
0.98	1.02	395	457	520	605	338	412	442	463
0.99	1.01	470	552	640	737	421	519	557	563

06610000 MISSOURI RIVER AT OMAHA, NEBRASKA

LOCATION.—Lat 41°15'32", long 95°55'20", in SE1/4 NW1/4 sec. 23, T15N, R13E sixth principal meridian, Douglas County, Nebraska, Hydrologic Unit 10230006, on right bank on left side of concrete floodwall, at foot of Douglas Street, 275 ft downstream from Interstate 480 Highway bridge in Omaha, and at mile 615.9.

DRAINAGE AREA.—322,800 mi^2 approximately. The 3,959 mi^2 in Great Divide Basin are not included.

PERIOD OF RECORD.—September 1928 to September 1996. April 1872 to December 1899 (gage heights only) in reports of the Missouri River Commission and since January 1875, (gage heights only) in reports of the U.S. Weather Bureau.

GAGE.—Water-stage recorder. Datum of gage is 948.24 ft above sea level. See WSP 1730 for history of changes prior to September 30, 1936. October 1, 1936 to September 30, 1982 at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 396,000 ft^3/s, April 18, 1952, gage height, 40.20 ft present datum; minimum daily discharge, 2,200 ft^3/s, January 6, 1937.

REMARKS.—Flow regulated by upstream main-stem reservoirs. Significant regulation is assumed to have begun in 1953.

Selected values from rating table number 5, developed January 1989

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
6.0	4,000	15.0	27,000
7.0	6,450	18.0	38,600
8.0	8,900	21.0	54,900
10.0	13,500	25.0	84,800
12.0	18,200	31.0	180,000

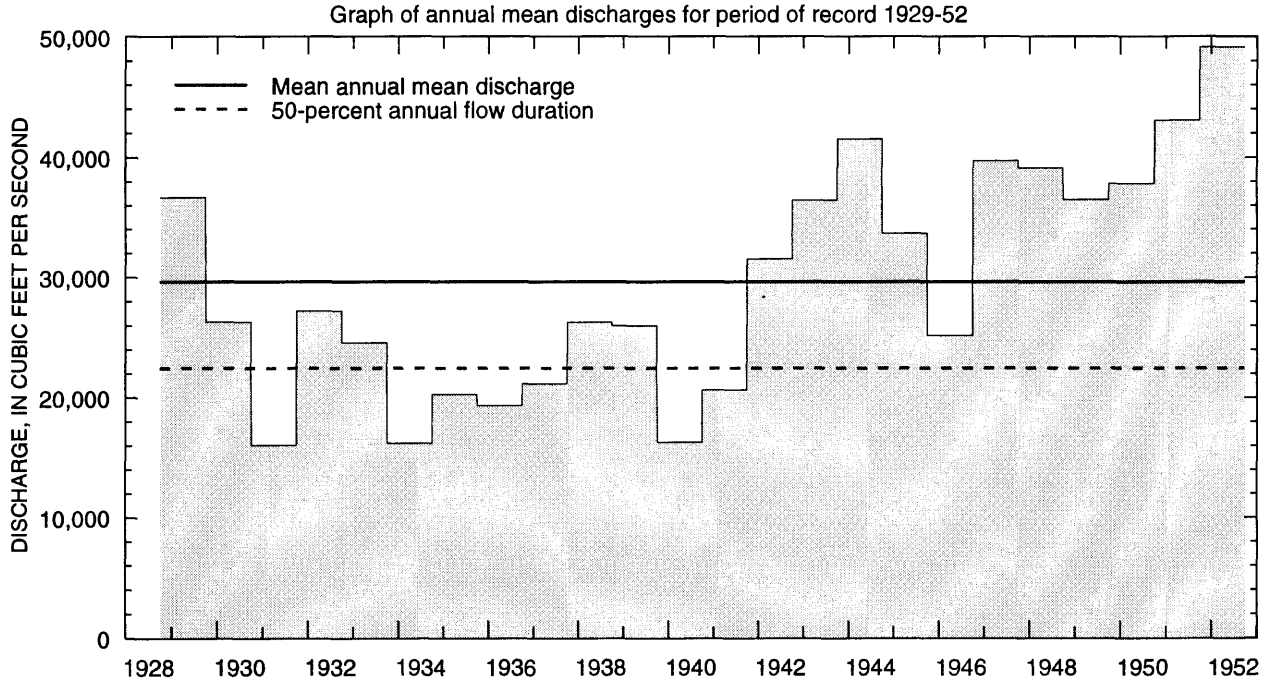
06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1929-52

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	45,790	1952	8,294	1935	21,540	10,970
November	39,920	1952	7,671	1936	19,230	9,057
December	16,890	1944	5,158	1938	9,613	2,959
January	18,430	1951	3,706	1940	10,040	3,548
February	31,790	1952	5,679	1940	13,700	6,169
March	65,080	1945	10,080	1940	32,450	14,320
April	188,800	1952	19,980	1931	55,350	39,650
May	80,230	1942	14,380	1931	35,890	15,380
June	113,900	1929	31,640	1940	59,070	21,200
July	84,110	1944	22,900	1934	47,940	18,460
August	54,140	1951	9,981	1934	26,770	10,840
September	54,180	1951	7,350	1934	23,540	11,110
Annual	49,150	1952	16,050	1931	29,610	9,553

Graph of annual mean discharges for period of record 1929-52



06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1929-52

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	6,800	4,610	3,100	3,000	5,100	6,950	14,800	13,900	20,400	13,300	9,130	6,470	4,200
95	8,610	7,140	4,200	4,000	5,600	9,430	17,700	15,500	25,000	17,800	10,400	8,050	6,340
90	8,990	8,100	4,860	5,200	6,200	12,600	19,500	18,800	29,100	21,500	12,100	9,260	8,020
85	9,510	9,680	5,500	5,920	7,400	15,000	20,400	20,700	32,500	25,100	14,700	10,400	9,200
80	10,500	10,400	5,860	6,500	8,300	15,800	22,000	21,800	35,400	28,800	16,300	12,000	10,500
75	11,500	10,900	6,300	7,010	8,680	16,900	23,400	22,600	38,300	31,600	17,900	13,400	12,000
70	12,000	11,500	6,600	7,670	9,200	17,900	25,300	23,400	41,000	33,500	19,600	15,000	14,000
60	16,200	14,000	7,400	8,500	10,500	19,800	30,100	26,600	46,600	38,200	22,100	19,200	18,000
50	20,600	17,100	8,200	9,200	11,800	23,500	37,000	31,900	52,600	43,300	25,400	23,500	22,500
40	23,800	19,900	9,310	10,200	13,600	27,700	44,500	35,800	58,300	49,200	28,600	27,400	27,500
30	27,400	23,700	10,700	11,400	15,000	35,100	58,900	41,200	69,100	56,800	32,000	29,800	33,400
25	29,400	25,900	11,700	12,500	16,400	40,400	69,500	44,400	75,200	60,000	33,900	30,700	37,200
20	32,100	28,600	12,600	13,700	18,000	48,100	79,400	47,700	81,400	63,600	36,100	31,800	42,000
15	34,800	30,500	14,000	15,000	20,500	57,300	97,300	52,900	87,600	69,400	38,200	33,000	48,800
10	37,200	36,000	16,000	16,200	24,200	67,800	126K	60,900	96,100	79,600	41,600	36,000	59,900
5	40,900	39,600	20,600	18,200	28,200	87,600	149K	70,300	117K	95,700	46,100	44,600	80,600

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 30 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	47,800
0.95	1.05	63,300
0.90	1.11	73,300
0.80	1.25	87,300
0.50	2	121,000
0.20	5	165,000
0.10	10	194,000
0.04	25	229,000
0.02	50	255,000
0.01	100	280,000
0.005	200	305,000

Magnitude and frequency of annual high discharges, based on period of record 1929-52

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	37,800	31,100	27,200	26,000
0.95	1.05	51,400	44,700	39,300	35,900
0.90	1.11	60,700	54,100	47,400	42,400
0.80	1.25	74,500	67,800	59,200	51,700
0.50	2	111,000	103,000	89,000	74,500
0.20	5	164,000	156,000	131,000	106,000
0.10	10	193,000	192,000	159,000	126,000
0.04	25	228,000	227,000	194,000	151,000
0.02	50	254,000	253,000	220,000	170,000
0.01	100	279,000	278,000	245,000	188,000
0.005	200	304,000	303,000	271,000	206,000

06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1929 to March 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,900	2,100	2,510	2,780	3,340	4,120	5,020	5,490	5,400X
0.02	50	2,090	2,290	2,690	3,010	3,650	4,490	5,360	5,930	6,050
0.05	20	2,420	2,600	3,000	3,400	4,160	5,100	5,960	6,690	7,180
0.10	10	2,760	2,940	3,330	3,800	4,670	5,720	6,580	7,480	8,360
0.20	5	3,250	3,430	3,810	4,360	5,380	6,590	7,470	8,600	10,100
0.50	2	4,530	4,690	5,060	5,740	7,040	8,640	9,770	11,400	14,300
0.80	1.25	6,420	6,600	6,940	7,650	9,200	11,400	13,200	15,500	20,300
0.90	1.11	7,770	7,970	8,310	8,930	10,600	13,200	15,600	18,400	24,400
0.96	1.04	9,590	9,840	10,200	10,600	12,300	15,400	18,900	22,100	29,600
0.98	1.02	11,000	11,300	11,700	11,900	13,500	17,100	21,500	25,100	33,600
0.99	1.01	12,500	12,900	13,200	13,900	14,700	18,700	24,300	28,100	37,600

Magnitude and frequency of seasonal low discharges, based on period of record
September 1928 to September 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1,930	2,420	2,890	3,640	10,800	11,200	11,900	13,200
0.02	50	2,230	2,750	3,260	4,120	11,500	12,000	12,900	14,400
0.05	20	2,760	3,320	3,890	4,930	12,900	13,600	14,500	16,400
0.10	10	3,320	3,920	4,530	5,730	14,300	15,100	16,100	18,500
0.20	5	4,130	4,760	5,430	6,820	16,400	17,400	18,500	21,500
0.50	2	6,140	6,820	7,570	9,290	21,800	23,300	24,700	28,600
0.80	1.25	8,930	9,590	10,400	12,200	29,900	32,200	34,000	38,400
0.90	1.11	10,800	11,400	12,200	13,900	35,800	38,600	40,600	44,800
0.96	1.04	13,100	13,600	14,300	15,900	43,800	47,200	49,600	53,000
0.98	1.02	14,700	15,200	15,900	17,200	50,100	54,100	56,700	59,200
0.99	1.01	16,400	16,800	17,400	18,400	56,900	61,400	64,200	65,300
		July-August-September				October-November-December			
0.01	100	4,400	4,490	4,780	5,450	2,180	2,890	3,220	4,200
0.02	50	5,190	5,320	5,680	6,470	2,400	3,120	3,520	4,580
0.05	20	6,590	6,810	7,300	8,300	2,780	3,510	4,020	5,230
0.10	10	8,110	8,430	9,040	10,300	3,160	3,910	4,520	5,870
0.20	5	10,400	10,800	11,600	13,100	3,700	4,460	5,180	6,750
0.50	2	16,200	17,000	18,000	20,100	5,040	5,800	6,690	8,800
0.80	1.25	24,600	25,800	26,800	29,400	6,900	7,640	8,540	11,400
0.90	1.11	30,300	31,600	32,500	35,200	8,160	8,860	9,660	13,100
0.96	1.04	37,600	39,000	39,400	42,200	9,770	10,400	11,000	15,100
0.98	1.02	43,000	44,000	44,300	47,100	11,000	11,600	11,900	16,500
0.99	1.01	48,400	48,500	49,100	51,800	12,200	12,800	12,800	17,900

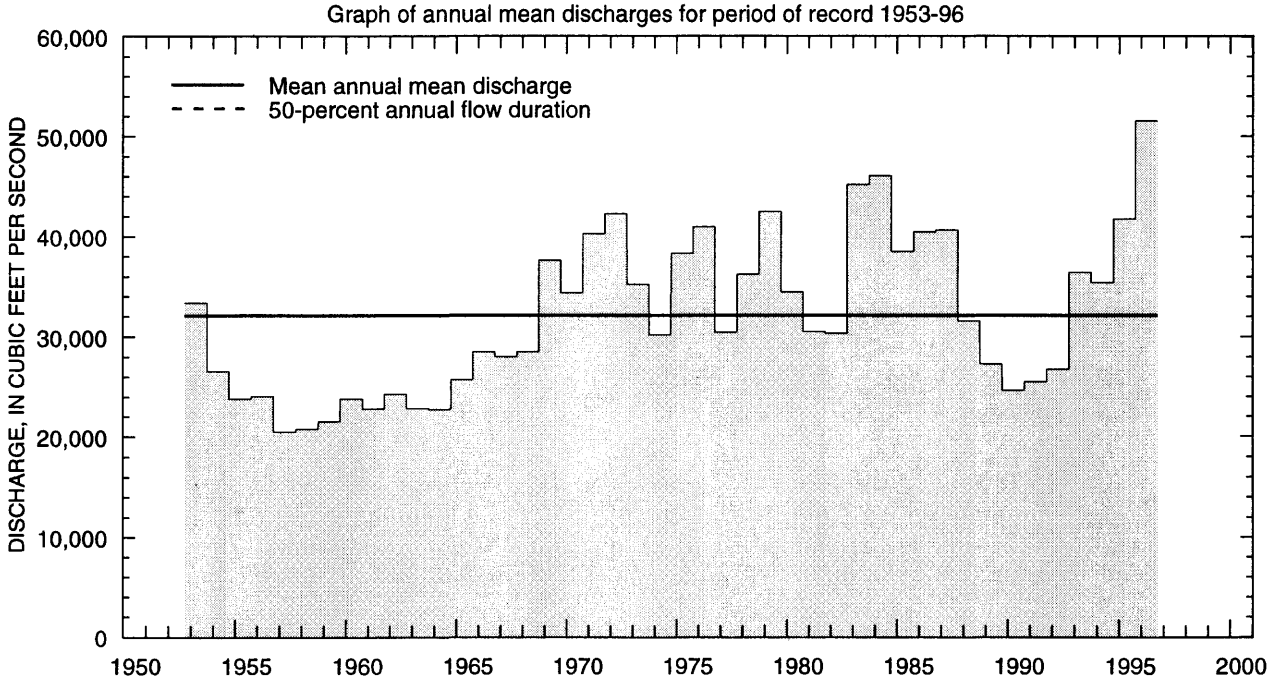
06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1953-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	64,570	1996	16,920	1962	37,230	10,190
November	66,130	1976	8,324	1962	32,090	15,170
December	42,800	1987	8,296	1962	19,740	9,271
January	33,250	1987	8,425	1964	16,790	6,443
February	36,590	1983	8,162	1963	18,920	7,145
March	53,980	1983	10,170	1957	27,350	10,020
April	66,320	1969	16,480	1957	37,540	10,310
May	60,430	1986	26,450	1961	37,370	8,419
June	75,730	1984	26,890	1961	41,020	11,750
July	78,560	1993	27,150	1958	39,870	10,820
August	66,810	1996	27,280	1958	38,560	9,864
September	65,020	1975	28,290	1958	38,470	9,596
Annual	51,560	1996	20,490	1957	32,120	7,920

Graph of annual mean discharges for period of record 1953-96



06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1953-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	9,690	7,920	4,400	5,650	7,710	7,200	11,100	24,600	24,400	24,800	24,000	27,200	7,800
95	27,200	9,520	8,060	7,910	8,400	9,540	25,000	26,000	26,800	27,800	28,400	28,200	9,700
90	28,000	12,200	9,100	8,760	9,140	11,500	26,400	27,100	28,400	29,200	29,800	29,400	13,000
85	29,200	13,400	9,770	9,380	9,750	13,500	27,400	28,400	29,600	30,200	30,400	30,400	16,600
80	30,200	15,700	10,400	9,950	10,400	14,900	28,400	29,600	30,700	31,200	31,200	31,100	19,000
75	31,000	17,300	11,700	10,700	11,800	17,200	29,700	30,900	32,100	32,000	32,100	31,800	22,500
70	31,500	20,800	12,900	11,800	14,300	18,200	30,800	31,900	33,100	32,800	32,700	32,400	26,100
60	32,600	29,200	16,100	15,000	16,900	21,500	32,900	33,300	34,500	34,600	33,900	33,700	29,700
50	34,200	32,100	18,300	16,500	18,400	25,900	34,600	34,600	36,500	36,100	34,900	35,000	32,100
40	36,200	34,300	20,000	17,600	19,700	29,700	36,500	37,000	39,500	38,900	36,400	36,500	34,100
30	38,800	38,000	22,400	19,800	22,000	32,900	39,400	39,800	43,100	42,400	39,700	39,600	36,600
25	41,900	42,000	23,900	21,100	23,500	34,600	41,700	42,000	46,700	44,600	43,000	41,800	38,700
20	44,400	44,900	26,900	22,500	24,900	37,300	45,500	44,400	50,300	48,600	45,100	46,600	41,700
15	49,700	53,100	29,700	24,500	26,600	40,600	49,300	47,500	53,100	50,600	49,900	50,400	45,500
10	53,100	55,200	33,700	25,900	28,800	44,800	52,100	51,600	56,600	53,300	54,700	55,200	51,100
5	60,200	57,800	40,700	29,000	33,300	51,800	60,600	55,900	69,600	62,000	61,000	59,700	57,000

Magnitude and frequency of instantaneous peak discharges[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	--
0.50	2	74,000
0.20	5	--
0.10	10	125,000
0.04	25	--
0.02	50	170,000
0.01	100	190,000
0.005	200	--
0.002	500	250,000

Magnitude and frequency of annual high discharges, based on period of record 1953-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	28,900	26,700	25,600	25,200
0.95	1.05	35,000	32,300	30,700	29,800
0.90	1.11	39,000	35,900	33,900	32,700
0.80	1.25	44,700	41,100	38,600	36,800
0.50	2	59,000	54,300	50,300	46,600
0.20	5	79,500	73,300	66,900	60,000
0.10	10	93,900	86,600	78,400	68,800
0.04	25	113,000	104,000	93,500	80,100
0.02	50	127,000	118,000	105,000	88,500
0.01	100	143,000	132,000	117,000	97,100
0.005	200	158,000	147,000	130,000	106,000

[a] *Final Report, Missouri River Flood Plain Study,* Missouri Basin States Association, May 1983. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

06610000 MISSOURI RIVER AT OMAHA, NEBRASKA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1953 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,960	2,130	3,160	4,650	5,230	5,760	5,950	6,350	10,300
0.02	50	2,370	2,600	3,750	5,300	5,940	6,520	6,770	7,260	11,400
0.05	20	3,150	3,500	4,810	6,420	7,170	7,830	8,190	8,830	13,200
0.10	10	4,030	4,500	5,960	7,600	8,450	9,170	9,650	10,500	15,100
0.20	5	5,390	6,040	7,670	9,290	10,300	11,100	11,700	12,800	17,700
0.50	2	9,210	10,300	12,100	13,500	14,700	15,600	16,700	18,400	23,800
0.80	1.25	15,300	16,700	18,400	19,300	20,700	21,700	23,400	25,900	32,000
0.90	1.11	19,700	21,100	22,600	23,200	24,500	25,600	27,700	30,800	37,200
0.96	1.04	25,700	26,900	27,800	28,000	29,300	30,400	32,900	36,700	43,600
0.98	1.02	30,300	31,200	31,600	31,600	32,800	33,800	36,700	41,000	48,300
0.99	1.01	35,100	35,500	35,500	35,500	36,300	37,200	40,400	45,200	53,000

Magnitude and frequency of seasonal low discharges, based on period of record
October 1952 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3,430	4,290	5,180	5,670	11,200	12,200	13,000	18,800
0.02	50	3,880	4,910	5,850	6,410	13,400	14,500	15,300	20,400
0.05	20	4,700	6,010	7,000	7,660	16,900	18,200	19,100	22,800
0.10	10	5,580	7,160	8,190	8,960	20,300	21,700	22,600	25,100
0.20	5	6,890	8,820	9,880	10,800	24,400	26,000	26,800	28,000
0.50	2	10,400	13,000	14,000	15,100	31,500	33,100	34,000	34,000
0.80	1.25	15,900	18,700	19,700	20,900	36,500	37,800	38,800	40,100
0.90	1.11	20,000	22,600	23,400	24,600	38,000	39,200	40,300	43,400
0.96	1.04	25,600	27,400	28,000	29,000	39,100	40,100	41,300	46,900
0.98	1.02	30,200	31,000	31,400	32,300	39,400	40,400	41,700	49,200
0.99	1.01	34,500	34,500	34,700	35,500	39,700	40,600	41,900	51,200
		July-August-September				October-November-December			
0.01	100	12,500	17,100	22,100	24,500	1,640	3,110	4,750	5,520
0.02	50	14,700	18,800	23,000	25,200	2,170	3,800	5,490	6,310
0.05	20	18,300	21,400	24,600	26,400	3,220	5,090	6,800	7,710
0.10	10	21,700	23,800	26,100	27,700	4,470	6,510	8,200	9,210
0.20	5	26,000	27,100	28,300	29,600	6,500	8,670	10,200	11,400
0.50	2	33,700	33,700	33,700	34,600	12,300	14,400	15,500	17,200
0.80	1.25	40,500	41,100	41,100	42,000	21,300	22,500	23,000	25,900
0.90	1.11	43,100	45,300	46,100	47,200	27,400	27,900	28,000	32,100
0.96	1.04	45,200	49,700	52,600	54,300	34,600	34,600	34,600	40,300
0.98	1.02	46,200	52,600	57,500	59,800	39,400	39,400	39,400	46,700
0.99	1.01	47,000	55,300	62,500	65,600	44,100	44,100	44,400	53,300

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06610500 INDIAN CREEK AT COUNCIL BLUFFS, IOWA

LOCATION.—Lat 41°17'32", long 95°49'59", in SE1/4 SW1/4 sec.18, T75N, R43W, Pottawattamie County, Hydrologic Unit 10230006, on left bank at downstream side of first bridge off State Highway 183, on Mud Hollow Road at north edge of Council Bluffs and 8.8 mi upstream from mouth.

DRAINAGE AREA.—7.99 mi^2.

PERIOD OF RECORD.—July 1954 to September 1976 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,038.86 ft above sea level (City of Council Bluffs benchmark). Prior to April 12, 1955, nonrecording gage at site 0.2 mi downstream at different datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 2,980 ft^3/s, September 7, 1965, gage height, 15.36 ft; no flow at times most years.

Selected values from rating table number 8, developed July 1975
A discharge measurement to validate this rating has not been made since October 1975.

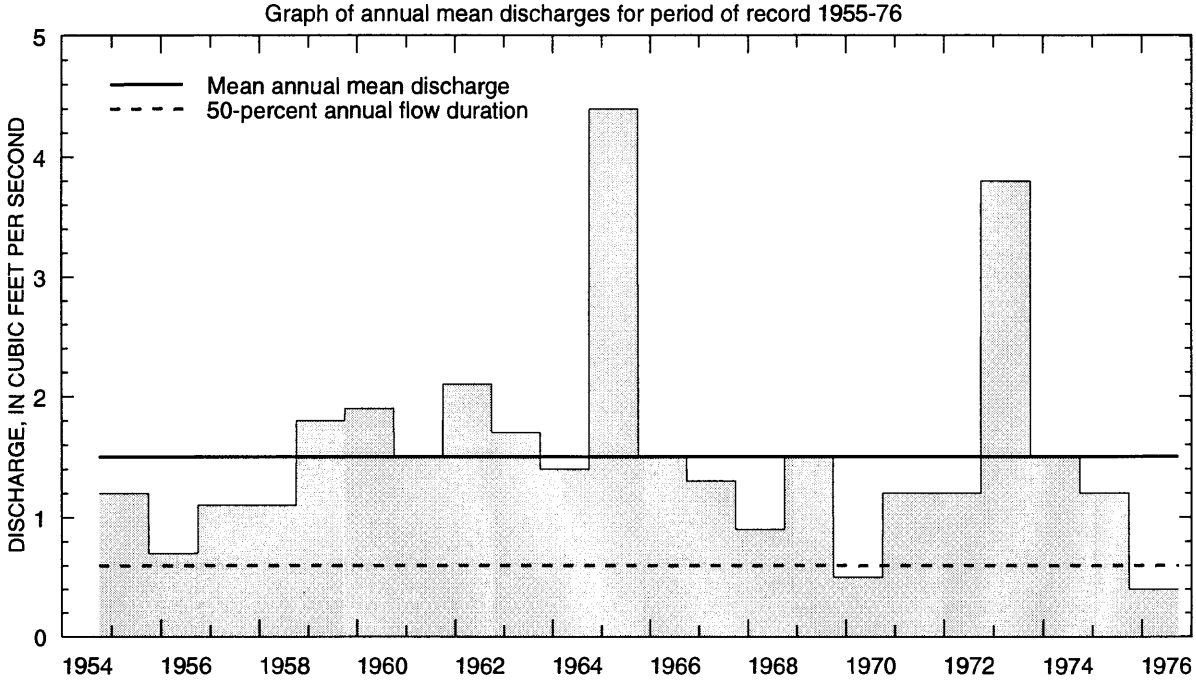
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	1.3	5.0	212
2.7	7.6	6.0	340
3.0	22	7.0	486
3.5	58	8.0	643
4.0	103		

06610500 INDIAN CREEK AT COUNCIL BLUFFS, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1955-76

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2.89	1962	0.000	1956	0.91	0.81
November	2.39	1973	0.010	1956	0.89	0.66
December	1.97	1973	0.023	1956	0.69	0.50
January	2.54	1973	0.000	1956	0.65	0.68
February	11.9	1965	0.079	1970	1.58	2.47
March	11.9	1965	0.55	1964	2.76	3.06
April	7.53	1973	0.25	1956	1.64	1.58
May	8.14	1959	0.15	1956	2.43	2.03
June	8.88	1967	0.017	1956	2.39	2.27
July	5.31	1973	0.085	1976	1.73	1.57
August	4.80	1959	0.000	1955	1.25	1.35
September	14.2	1965	0.000	1976	1.63	3.00
Annual	4.40	1965	0.37	1976	1.54	0.94

Graph of annual mean discharges for period of record 1955-76



06610500 INDIAN CREEK AT COUNCIL BLUFFS, IOWA—Continued

Monthly and annual flow durations, based on period of record 1955-76

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.10	0.01	0.00	0.00	0.00	0.00
90	0.00	0.12	0.10	0.00	0.05	0.40	0.33	0.20	0.10	0.00	0.00	0.00	0.06
85	0.10	0.20	0.20	0.02	0.10	0.50	0.40	0.30	0.20	0.04	0.01	0.00	0.13
80	0.20	0.20	0.20	0.10	0.10	0.54	0.50	0.40	0.26	0.10	0.09	0.07	0.20
75	0.30	0.30	0.30	0.10	0.20	0.60	0.60	0.50	0.40	0.19	0.16	0.17	0.30
70	0.33	0.40	0.40	0.20	0.30	0.70	0.69	0.60	0.50	0.20	0.22	0.20	0.40
60	0.40	0.52	0.50	0.30	0.40	0.80	0.84	0.86	0.70	0.31	0.39	0.38	0.50
50	0.52	0.68	0.54	0.40	0.60	1.0	1.1	1.2	0.93	0.50	0.46	0.50	0.60
40	0.64	0.80	0.65	0.50	0.70	1.3	1.5	1.4	1.2	0.70	0.50	0.60	0.80
30	0.90	0.99	0.80	0.70	0.99	1.9	1.8	1.7	1.5	0.90	0.60	0.73	1.1
25	1.1	1.1	0.92	0.80	1.1	2.2	1.9	1.9	1.7	1.0	0.68	0.80	1.3
20	1.3	1.6	1.0	0.85	1.7	2.9	2.1	2.3	2.1	1.2	0.80	0.92	1.6
15	1.6	1.8	1.2	1.0	2.1	3.5	2.5	3.0	2.8	1.4	0.92	1.2	1.9
10	2.0	2.0	1.5	1.5	2.7	5.5	3.2	4.0	3.3	1.8	1.4	1.8	2.4
5	2.7	2.3	1.8	2.1	4.4	8.8	4.7	7.5	8.1	5.1	2.5	4.0	4.0

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 27 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	69
0.90	1.11	112
0.80	1.25	196
0.50	2	547
0.20	5	1,420
0.10	10	2,270
0.04	25	3,680
0.02	50	4,970
0.01	100	6,460
0.005	200	8,160

Magnitude and frequency of annual high discharges, based on period of record 1955-76

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	2.0	1.0	0.63	0.57
0.95	1.05	4.6	2.4	1.5	1.3
0.90	1.11	6.8	3.7	2.4	1.8
0.80	1.25	11	5.9	3.8	2.8
0.50	2	23	12	8.0	5.4
0.20	5	44	23	14	9.1
0.10	10	59	29	18	11
0.04	25	77	36	23	14
0.02	50	91	41	25	15
0.01	100	104	46	28	17
0.005	200	117	49	30	18

06610500 INDIAN CREEK AT COUNCIL BLUFFS, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1955 to March 1976

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
0.05	20	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.06	0.17
0.10	10	0.00	0.00	0.00	0.00	0.00	0.07	0.13	0.15	0.23
0.20	5	0.00	0.00	0.00	0.00	0.04	0.12	0.19	0.24	0.33
0.50	2	0.00	0.00	0.02	0.07	0.16	0.28	0.39	0.48	0.62
0.80	1.25	0.16	0.21	0.23	0.25	0.38	0.61	0.75	0.88	1.1
0.90	1.11	0.28	0.33	0.39	0.44	0.55	0.89	1.1	1.2	1.5
0.96	1.04	0.44	0.50	0.61	0.74	0.77	1.3	1.5	1.6	2.0
0.98	1.02	0.57	0.60	0.77	1.0	1.2	1.7	1.9	2.0	2.5
0.99	1.01	0.69	0.80	0.93	1.4	1.7	2.1	2.3	2.5	2.9

Magnitude and frequency of seasonal low discharges, based on period of record July 1954 to September 1976

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.05	20	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.07
0.10	10	0.00	0.00	0.00	0.05	0.00	0.02	0.12	0.14
0.20	5	0.00	0.00	0.03	0.10	0.01	0.11	0.21	0.29
0.50	2	0.00	0.09	0.15	0.33	0.31	0.39	0.51	0.86
0.80	1.25	0.50	0.54	0.60	0.87	0.85	0.99	1.1	1.7
0.90	1.11	0.86	1.0	1.1	1.4	1.2	1.5	1.7	2.2
0.96	1.04	1.4	1.8	1.9	2.2	1.5	2.2	2.5	2.7
0.98	1.02	1.8	2.4	2.8	3.0	1.6	2.8	3.2	3.5
0.99	1.01	2.3	3.1	3.7	3.8	1.7	3.5	3.9	4.1
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
0.20	5	0.00	0.00	0.01	0.08	0.00	0.00	0.08	0.17
0.50	2	0.09	0.18	0.19	0.37	0.13	0.28	0.33	0.46
0.80	1.25	0.33	0.42	0.49	0.75	0.47	0.65	0.75	0.90
0.90	1.11	0.46	0.53	0.67	0.95	0.80	0.90	1.1	1.2
0.96	1.04	0.58	0.62	0.84	1.1	1.1	1.2	1.4	1.6
0.98	1.02	0.66	0.70	0.94	1.2	1.3	1.4	1.7	1.8
0.99	1.01	0.71	0.80	1.0	1.3	1.5	1.6	2.0	2.1

06610520 MOSQUITO CREEK NEAR EARLING, IOWA

LOCATION.—Lat 41°45'10", long 95°27'50", in N1/2 SE1/4 sec. 11, T80N, R40W, Shelby County, Hydrologic Unit 10230006, on right bank at stream stabilization structure 1,300 ft downstream from bridge on State Highway 191, 0.5 mi downstream from small left bank tributary and 2.3 mi southwest of Earling.

DRAINAGE AREA.—32.0 mi^2.

PERIOD OF RECORD.—August 1965 to September 1979 (discontinued).

GAGE.—Duplex water-stage recorder. Datum of gage is 1,222.56 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 12,000 ft^3/s, September 11, 1972, gage height, 31.18 ft; no flow August 21–22, 26–30, 1970, September 7–9, 1971, January 5–6, 14–17, 1972, May 12–17, June 11, July 4–5, 14, 1977.

Selected values from rating table number 3, developed March 1969
(A discharge measurement to validate this rating has not been made since June 1973)

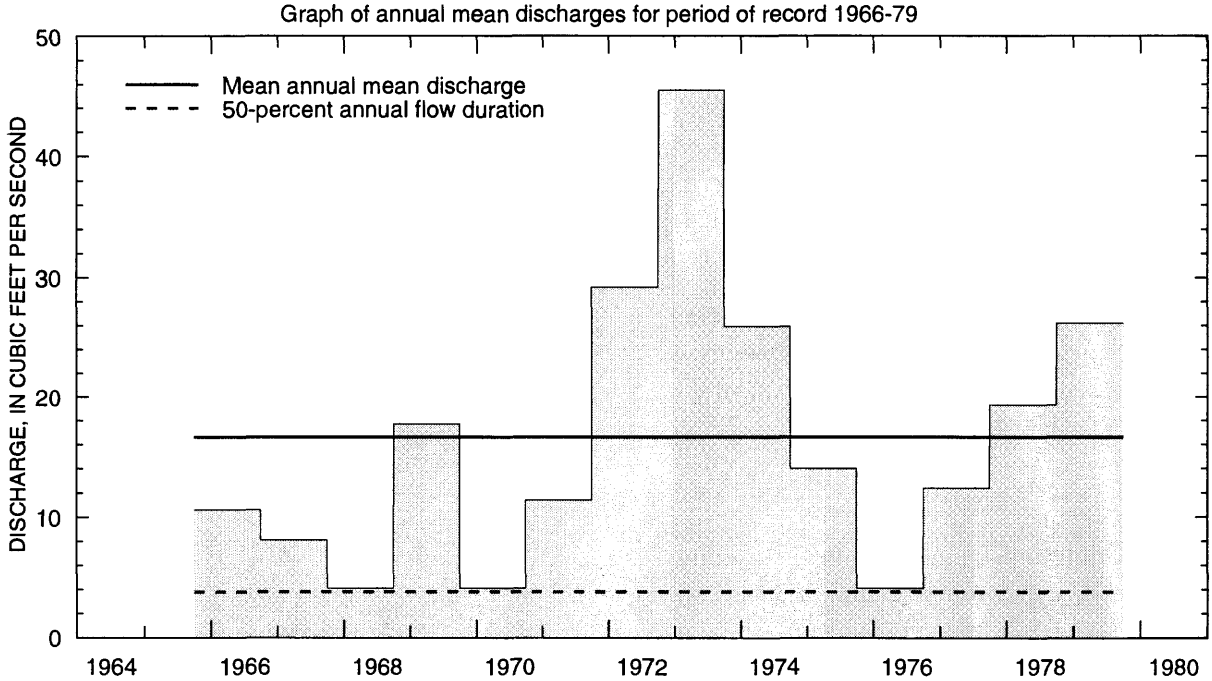
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
18.5	8.0	21.0	1030
18.7	13	23.0	2780
18.9	35	25.0	5000
19.0	55	27.0	7400
19.5	219	31.0	11800
20.0	445		

06610520 MOSQUITO CREEK NEAR EARLING, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1966-79

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	58.8	1974	0.40	1977	9.99	16.0
November	42.8	1973	0.58	1977	9.73	12.8
December	34.4	1973	0.18	1977	6.25	9.81
January	44.5	1973	0.078	1971	5.90	11.9
February	61.9	1971	0.62	1977	15.2	20.5
March	120	1979	1.21	1968	35.9	41.9
April	67.7	1973	1.25	1977	15.9	20.1
May	71.1	1973	1.57	1968	19.7	20.9
June	70.6	1967	1.17	1977	21.4	19.8
July	60.4	1973	1.88	1970	14.0	16.1
August	21.5	1973	0.48	1971	6.70	6.65
September	289	1972	0.28	1971	39.1	78.1
Annual	45.5	1973	4.05	1970	16.6	11.8

Graph of annual mean discharges for period of record 1966-79



06610520 MOSQUITO CREEK NEAR EARLING, IOWA—Continued

Monthly and annual flow durations, based on period of record 1966-79

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.09	0.29	0.05	0.00	0.15	0.66	0.08	0.00	0.03	0.03	0.00	0.09	0.03
95	0.18	0.65	0.15	0.02	0.25	1.0	1.0	0.71	0.43	0.54	0.18	0.18	0.21
90	0.36	0.80	0.20	0.14	0.40	1.5	1.3	1.2	0.78	1.1	0.36	0.43	0.56
85	0.50	1.2	0.50	0.20	0.92	1.9	1.6	1.4	1.3	1.4	0.50	0.57	0.88
80	0.76	1.4	0.76	0.25	1.1	2.2	1.9	1.8	2.1	1.8	0.66	0.88	1.2
75	1.2	1.8	0.90	0.60	1.2	2.9	2.4	3.0	2.6	2.1	0.91	1.2	1.4
70	1.4	1.9	1.2	0.70	1.6	3.6	3.0	4.1	3.4	2.6	1.3	1.3	1.8
60	2.2	2.4	1.5	1.1	2.0	4.7	5.1	5.6	5.2	3.8	2.1	2.0	2.6
50	2.9	3.4	2.1	1.9	2.5	6.0	6.6	6.6	7.0	4.9	3.0	2.8	3.8
40	4.4	4.5	3.1	2.4	4.0	8.0	8.9	9.3	11	6.2	4.0	4.2	5.3
30	6.3	6.5	4.0	2.9	4.9	16	16	15	15	9.1	5.8	6.0	8.0
25	7.8	9.9	4.9	3.5	6.5	22	18	17	17	10	6.8	8.0	11
20	15	14	10	5.2	8.9	33	21	19	19	11	7.5	10	14
15	22	25	12	9.5	13	46	28	25	22	14	8.3	13	18
10	30	27	16	16	17	66	44	34	41	16	12	22	26
5	40	41	22	20	56	150	60	72	89	49	20	49	50

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 19 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	980
0.80	1.25	1,450
0.50	2	2,930
0.20	5	5,530
0.10	10	7,520
0.04	25	10,300
0.02	50	12,400
0.01	100	14,600
0.005	200	16,900

Magnitude and frequency of annual high discharges, based on period of record 1966-79

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	17	10	6.8	5.2
0.95	1.05	48	27	17	12
0.90	1.11	79	43	26	19
0.80	1.25	139	73	43	30
0.50	2	368	186	103	67
0.20	5	842	417	224	132
0.10	10	1,230	607	323	179
0.04	25	1,770	876	462	240
0.02	50	2,190	1,090	573	286
0.01	100	2,620	1,310	689	330
0.005	200	3,060	1,540	808	373

06610520 MOSQUITO CREEK NEAR EARLING, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1966 to March 1979

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.01	0.02	0.08	0.15	0.27	0.27
0.02	50	0.00	0.00	0.00	0.02	0.03	0.11	0.19	0.34	0.34
0.05	20	0.00	0.00	0.00	0.03	0.05	0.17	0.28	0.47	0.47
0.10	10	0.00	0.00	0.02	0.06	0.10	0.25	0.39	0.62	0.67
0.20	5	0.00	0.00	0.07	0.13	0.20	0.43	0.61	0.88	1.0
0.50	2	0.25	0.30	0.34	0.51	0.76	1.2	1.5	1.9	2.8
0.80	1.25	1.0	1.1	1.4	1.9	2.7	3.5	4.0	4.6	9.2
0.90	1.11	2.4	2.4	2.9	3.7	5.0	6.1	6.9	7.8	19
0.96	1.04	5.8	5.8	6.1	7.4	9.6	12	13	14	41
0.98	1.02	11	11	11	11	15	17	19	21	72
0.99	1.01	15	15	15	17	21	25	28	32	121

Magnitude and frequency of seasonal low discharges, based on period of record October 1965 to September 1979

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.01	0.01	0.03	0.00	0.00	0.07	0.18
0.02	50	0.00	0.02	0.02	0.05	0.00	0.00	0.12	0.28
0.05	20	0.00	0.04	0.04	0.11	0.00	0.00	0.28	0.53
0.10	10	0.02	0.09	0.09	0.20	0.27	0.43	0.55	0.89
0.20	5	0.12	0.22	0.24	0.41	0.73	1.1	1.2	1.6
0.50	2	0.78	1.0	1.2	1.6	2.6	3.3	3.9	4.9
0.80	1.25	3.2	4.1	4.7	5.5	8.0	8.9	11	13
0.90	1.11	6.0	7.7	8.8	10	14	15	16	21
0.96	1.04	11	14	16	19	24	24	24	33
0.98	1.02	16	21	23	29	29	30	30	44
0.99	1.01	21	29	30	42	30	32	35	57
		July-August-September				October-November-December			
0.01	100	0.00	0.01	0.02	0.10	0.01	0.02	0.07	0.13
0.02	50	0.00	0.01	0.04	0.14	0.02	0.03	0.09	0.18
0.05	20	0.00	0.03	0.08	0.25	0.04	0.06	0.15	0.28
0.10	10	0.00	0.06	0.16	0.41	0.07	0.11	0.24	0.43
0.20	5	0.00	0.16	0.32	0.73	0.16	0.25	0.42	0.72
0.50	2	0.73	0.77	1.2	2.1	0.74	1.1	1.4	2.1
0.80	1.25	2.7	3.2	3.7	5.6	3.7	4.8	5.1	6.6
0.90	1.11	5.1	6.3	6.5	9.0	8.8	10	10	12
0.96	1.04	9.3	12	13	15	23	24	24	25
0.98	1.02	14	18	19	20	39	39	39	40
0.99	1.01	20	26	26	26	62	63	64	65

06806000 WAUBONSIE CREEK NEAR BARTLETT, IOWA

LOCATION.—Lat 40°53'04", long 95°44'47", in NE1/4 NE1/4 sec. 11, T70N, R43W, Fremont County, Hydrologic Unit 10240001, on left pier on downstream side of highway bridge, 2.5 mi east of Bartlett, 3.5 mi west of Tabor and 3.6 mi upstream from mouth.

DRAINAGE AREA.—30.4 mi^2.

PERIOD OF RECORD.—January 1946 to September 1969 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 936.96 ft above sea level. Prior to June 16, 1951, nonrecording gage and January 10, 1946 to May 8, 1950, supplementary high-stage recorder, at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 14,500 ft^3/s, May 8, 1950, gage height, 37.8 ft, from flood mark and rating curve extended above 3,900 ft^3/s on basis of slope-area measurements at gage heights 32.8 ft and 37.8 ft; no flow at times 1954-59.

Selected values from rating table number 8, developed March 1965
(A discharge measurement to validate this rating has not been made since October 1969)

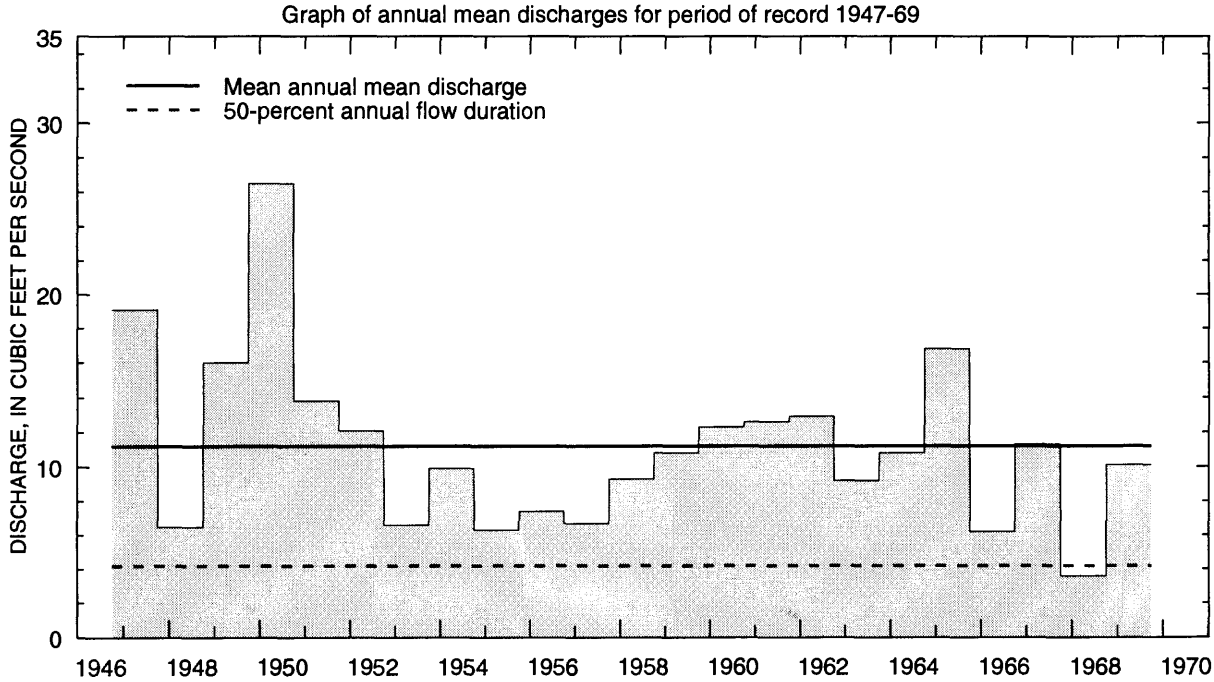
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
11.5	18	15.0	411
12.0	42	16.0	625
12.5	75	17.0	890
13.0	120	18.0	1,190
14.0	244		

06806000 WAUBONSIE CREEK NEAR BARTLETT, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1947-69

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	14.2	1947	0.058	1957	5.27	3.93
November	11.4	1962	0.63	1957	4.34	2.60
December	9.04	1962	0.53	1956	3.65	2.28
January	14.3	1949	0.23	1957	4.04	3.41
February	25.0	1969	1.58	1957	8.38	6.52
March	34.6	1949	3.30	1957	14.8	9.59
April	19.1	1952	2.63	1956	8.63	5.01
May	139	1950	1.87	1956	18.1	28.4
June	152	1947	0.55	1958	29.2	37.8
July	54.2	1958	0.29	1955	14.9	15.6
August	52.2	1954	0.071	1955	12.6	13.1
September	26.6	1961	1.52	1953	10.2	7.53
Annual	26.5	1950	3.63	1968	11.2	5.05

Graph of annual mean discharges for period of record 1947-69



06806000 WAUBONSIE CREEK NEAR BARTLETT, IOWA—Continued

Monthly and annual flow durations, based on period of record 1947-69

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.39	0.20	0.10	0.00	1.7	1.4	1.0	0.00	0.00	0.00	0.00	0.00
95	0.30	0.60	0.67	0.50	0.30	2.3	2.0	1.6	0.40	0.20	0.00	0.00	0.60
90	1.0	1.3	1.0	0.74	1.0	2.6	2.8	2.2	1.0	0.50	1.0	0.80	1.1
85	1.3	1.6	1.4	1.0	1.5	3.0	3.2	2.5	1.5	0.70	1.3	1.2	1.6
80	1.6	2.0	1.6	1.1	1.8	3.8	3.6	3.1	2.0	1.3	1.7	1.5	1.8
75	1.8	2.4	1.8	1.4	2.1	4.5	3.8	3.5	3.0	1.7	1.9	1.7	2.2
70	2.0	2.6	2.0	1.5	2.5	5.0	4.2	3.9	3.5	2.2	2.2	2.0	2.6
60	2.6	3.0	2.5	2.0	3.0	6.5	5.0	4.7	4.5	3.5	2.6	2.8	3.4
50	3.1	3.4	3.0	3.0	4.3	7.7	6.0	5.8	5.7	4.3	3.5	3.5	4.2
40	4.0	4.0	3.5	3.5	5.4	9.0	7.0	7.0	7.1	5.1	4.3	4.5	5.2
30	4.8	4.8	4.5	4.0	6.6	12	8.7	8.1	9.5	6.0	5.9	5.7	6.5
25	5.4	5.6	5.0	5.0	7.1	14	9.8	9.0	12	6.8	6.5	6.4	7.2
20	5.9	6.3	6.0	6.0	8.0	15	11	10	15	8.1	8.0	7.7	8.2
15	6.5	6.7	6.7	6.5	9.0	19	13	13	20	10	11	9.0	10
10	7.3	7.4	7.4	7.3	12	30	15	17	36	13	19	13	14
5	11	9.1	8.5	8.8	25	50	24	36	89	34	55	43	27

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 24 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	642
0.90	1.11	908
0.80	1.25	1,370
0.50	2	2,870
0.20	5	5,760
0.10	10	8,130
0.04	25	11,600
0.02	50	14,500
0.01	100	17,600
0.005	200	20,900

Magnitude and frequency of annual high discharges, based on period of record 1947-69

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	21	12	6.3	4.8
0.95	1.05	44	24	14	9.8
0.90	1.11	63	34	20	14
0.80	1.25	96	50	30	21
0.50	2	199	103	64	42
0.20	5	380	200	121	77
0.10	10	516	277	162	102
0.04	25	699	384	215	133
0.02	50	839	470	255	156
0.01	100	982	560	294	178
0.005	200	1,130	654	333	200

06806000 WAUBONSIE CREEK NEAR BARTLETT, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1946 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.26	0.36	0.59
0.02	50	0.00	0.00	0.00	0.00	0.00	0.06	0.38	0.50	0.80
0.05	20	0.00	0.00	0.00	0.00	0.00	0.18	0.62	0.78	1.2
0.10	10	0.00	0.00	0.00	0.02	0.14	0.41	0.93	1.1	1.7
0.20	5	0.00	0.05	0.09	0.18	0.56	0.92	1.4	1.7	2.5
0.50	2	0.64	0.73	0.85	1.0	1.7	2.6	2.9	3.2	4.5
0.80	1.25	1.7	2.0	2.2	2.7	3.4	4.5	4.9	5.4	6.9
0.90	1.11	2.6	2.9	3.1	3.9	4.6	5.1	6.0	6.7	8.1
0.96	1.04	3.9	3.9	4.1	5.2	6.0	6.2	7.2	8.1	9.4
0.98	1.02	4.5	4.5	4.8	6.1	6.9	7.3	8.0	9.0	10
0.99	1.01	5.0	5.0	5.5	6.8	7.8	8.1	8.6	9.8	11

Magnitude and frequency of seasonal low discharges, based on period of record February 1946 to September 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.01	0.11	0.00	0.00	0.07	0.26
0.02	50	0.00	0.00	0.03	0.18	0.00	0.00	0.13	0.41
0.05	20	0.00	0.04	0.10	0.34	0.00	0.10	0.31	0.75
0.10	10	0.10	0.20	0.22	0.58	0.30	0.45	0.62	1.2
0.20	5	0.41	0.46	0.53	1.0	0.80	1.0	1.3	2.0
0.50	2	1.4	1.5	1.8	2.6	2.0	2.9	3.4	4.6
0.80	1.25	3.2	3.4	4.0	5.1	3.9	5.2	6.3	8.2
0.90	1.11	4.5	4.8	5.1	6.8	5.2	6.3	7.7	10
0.96	1.04	6.3	6.5	6.6	8.6	6.8	7.3	8.8	12
0.98	1.02	7.6	7.6	7.8	9.7	7.8	7.8	9.2	14
0.99	1.01	8.7	8.7	9.0	11	8.1	8.1	9.6	15
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
0.05	20	0.00	0.00	0.00	0.12	0.00	0.17	0.26	0.28
0.10	10	0.00	0.00	0.07	0.52	0.21	0.47	0.59	0.60
0.20	5	0.00	0.25	0.41	1.2	0.68	0.84	1.1	1.3
0.50	2	0.98	1.5	1.8	3.4	1.7	1.9	2.3	3.2
0.80	1.25	2.5	3.4	4.4	6.5	3.2	3.6	4.0	4.8
0.90	1.11	3.6	4.6	6.1	8.2	4.0	4.7	5.1	5.2
0.96	1.04	4.8	5.7	8.1	9.9	5.0	6.1	6.5	6.7
0.98	1.02	5.7	6.4	9.4	11	5.6	7.1	7.4	7.7
0.99	1.01	6.5	6.9	11	12	6.2	8.0	8.3	8.7

06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA

LOCATION.—Lat 40°40'55", long 95°50'48", in NW1/4 NE1/4 sec. 9, T8N, R14E sixth principal meridian, Otoe County, Nebraska, Hydrologic Unit 10240001, on right bank 1.0 mi upstream from Highway 2 Bridge at Nebraska City, and at mile 562.6.

DRAINAGE AREA.—410,000 mi^2 approximately. The 3,959 mi^2 in Great Divide Basin are not included.

PERIOD OF RECORD.—August 1929 to September 1996. Gage height records collected in this vicinity from August 1878 to December 1899 are contained in reports of Missouri River Commission.

GAGE.—Water-stage recorder. Datum of gage is 905.36 ft above sea level, supplementary adjustment of 1954. See WSP 1918 or 1919 for history of changes prior to April 1, 1963.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 414,000 ft^3/s, April 19, 1952; maximum gage height, 27.66 ft, April 18, 1952; minimum daily discharge, 1,800 ft^3/s, December 31, 1946.

REMARKS.—Flow regulated by upstream main-stem reservoirs. Significant regulation is assumed to have begun in 1953.

Selected values from rating table number 8, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	17,000	12.0	47,700
6.0	21,300	15.0	62,600
7.0	25,600	18.0	80,700
8.0	29,900	21.0	114,000
10.0	38,600	25.0	184,000

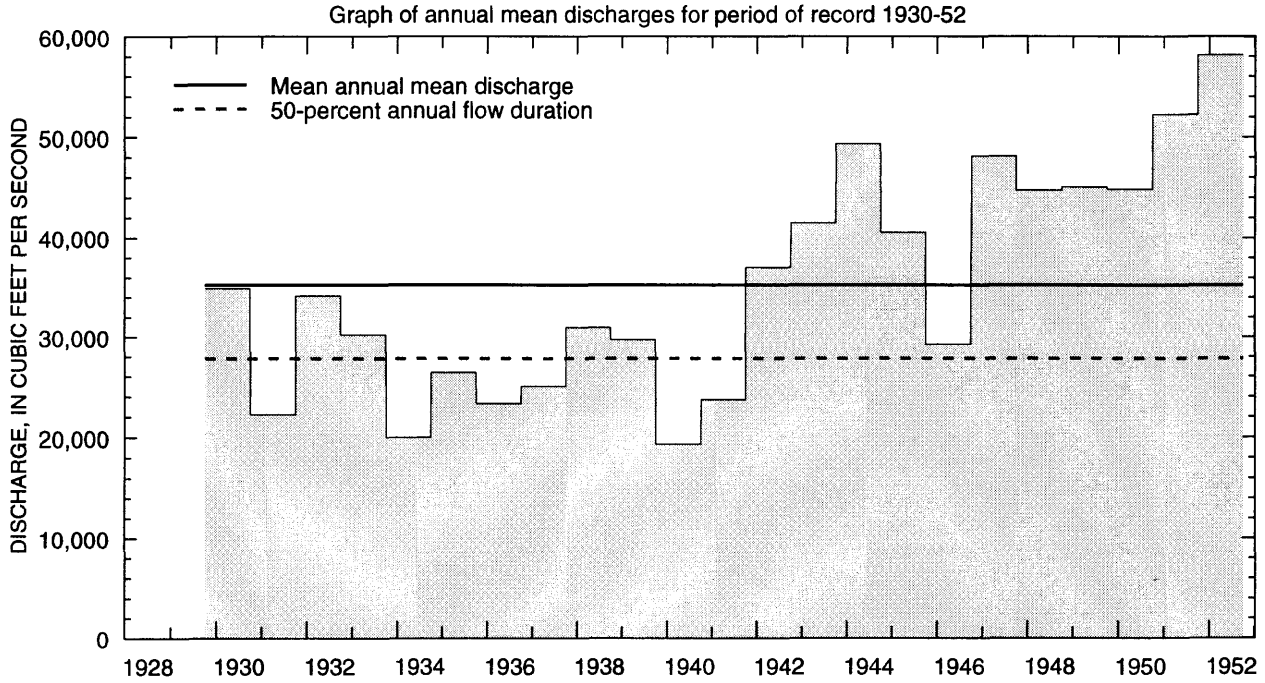
06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1930-52

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	53,860	1952	11,050	1935	25,390	12,260
November	47,550	1952	11,960	1941	23,520	9,800
December	21,450	1952	7,449	1933	13,030	3,445
January	21,400	1952	5,009	1940	13,380	4,444
February	44,520	1952	8,103	1940	19,870	8,376
March	83,030	1949	16,990	1940	41,740	17,310
April	199,600	1952	26,080	1934	61,800	42,020
May	89,370	1942	21,270	1931	44,030	18,610
June	123,500	1944	35,150	1934	67,870	23,620
July	92,380	1944	24,540	1936	53,840	21,200
August	63,270	1951	11,460	1934	30,830	12,750
September	63,200	1951	10,090	1934	27,640	12,280
Annual	58,180	1952	19,360	1940	35,250	11,190

Graph of annual mean discharges for period of record 1930-52



06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1930-52

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8,620	6,670	3,820	3,800	6,900	12,000	18,600	18,100	24,700	14,600	10,800	8,730	5,240
95	10,600	10,700	5,000	5,500	7,760	15,600	21,800	20,600	29,900	19,400	12,000	10,300	8,600
90	11,000	12,100	5,810	6,400	8,500	19,400	23,700	22,700	34,400	24,000	13,700	11,200	10,800
85	11,800	12,800	7,000	7,240	9,170	20,700	25,200	24,700	37,500	27,900	17,300	12,900	12,200
80	12,400	13,300	8,000	8,480	10,800	22,200	27,200	26,300	40,900	30,900	19,000	14,800	13,900
75	13,900	14,300	8,730	8,900	11,500	23,700	28,600	27,700	44,700	34,200	20,800	16,900	15,800
70	15,600	14,800	9,300	9,600	12,600	24,900	30,400	28,700	49,200	36,500	22,200	18,700	18,300
60	19,400	17,100	10,500	11,200	14,700	28,600	35,500	32,100	55,000	41,900	25,400	23,300	23,200
50	24,500	21,700	11,900	12,300	16,600	32,900	42,800	37,600	62,800	49,400	28,900	28,300	27,800
40	27,600	26,000	13,100	13,800	20,000	38,000	51,700	45,100	70,100	55,800	32,700	31,700	32,600
30	31,000	29,300	14,800	16,000	22,600	45,700	67,300	51,800	80,300	63,000	36,600	33,500	39,200
25	33,700	31,300	15,800	17,000	24,700	53,200	75,600	55,900	85,800	66,800	38,900	34,200	43,500
20	36,300	32,600	17,400	18,200	27,000	61,200	90,900	60,500	91,700	73,600	41,200	35,500	50,200
15	38,600	34,600	19,000	20,000	30,000	69,800	111K	67,000	96,600	78,900	43,100	37,600	58,200
10	41,000	41,000	21,400	22,000	34,000	81,400	133K	73,300	106K	92,000	46,700	41,500	70,500
5	49,600	43,600	26,400	23,800	42,500	100K	157K	88,700	128K	108K	57,500	50,800	92,300

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 29 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	56,200
0.95	1.05	72,200
0.90	1.11	82,400
0.80	1.25	96,400
0.50	2	129,000
0.20	5	172,000
0.10	10	199,000
0.04	25	232,000
0.02	50	255,000
0.01	100	278,000
0.005	200	301,000

Magnitude and frequency of annual high discharges, based on period of record 1930-52

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	46,600	39,100	32,200	29,900
0.95	1.05	60,200	52,900	44,900	40,500
0.90	1.11	69,400	62,200	53,400	47,500
0.80	1.25	82,800	75,600	65,600	57,400
0.50	2	118,000	110,000	96,200	82,000
0.20	5	171,000	161,000	139,000	116,000
0.10	10	198,000	196,000	167,000	138,000
0.04	25	231,000	230,000	203,000	167,000
0.02	50	254,000	253,000	230,000	188,000
0.01	100	277,000	276,000	256,000	209,000
0.005	200	300,000	299,000	283,000	230,000

06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1930 to March 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	1,720	2,430	2,950	3,410	4,420	5,230	6,900	7,290	7,140X
0.02	50	2,010	2,680	3,210	3,750	4,900	5,850	7,450	7,960	8,020
0.05	20	2,510	3,100	3,660	4,320	5,680	6,870	8,360	9,080	9,530
0.10	10	3,040	3,540	4,110	4,880	6,440	7,870	9,280	10,200	11,100
0.20	5	3,800	4,170	4,760	5,660	7,430	9,200	10,600	11,800	13,300
0.50	2	5,630	5,780	6,350	7,440	9,540	12,100	13,600	15,700	18,600
0.80	1.25	8,040	8,100	8,590	9,700	11,900	15,400	17,800	20,900	25,700
0.90	1.11	9,530	9,720	10,100	11,100	13,200	17,200	20,500	24,300	30,300
0.96	1.04	11,300	11,900	12,100	12,800	14,600	19,200	24,000	28,700	36,000
0.98	1.02	12,600	13,500	13,600	14,000	15,500	20,600	26,600	31,900	40,200
0.99	1.01	13,800	15,200	15,200	15,200	16,300	21,800	29,200	35,200	44,400

Magnitude and frequency of seasonal low discharges, based on period of record September 1929 to September 1952

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2,390	3,090	3,630	4,480	12,900	13,900	14,800	17,200
0.02	50	2,810	3,560	4,150	5,150	13,800	14,900	15,800	18,500
0.05	20	3,520	4,350	5,020	6,270	15,400	16,500	17,600	20,700
0.10	10	4,250	5,160	5,900	7,400	17,100	18,300	19,400	22,900
0.20	5	5,260	6,270	7,090	8,910	19,500	20,900	22,200	26,200
0.50	2	7,570	8,780	9,770	12,200	26,000	27,800	29,600	34,500
0.80	1.25	10,300	11,800	12,900	16,000	35,800	38,600	41,500	46,800
0.90	1.11	11,800	13,500	14,700	18,100	43,000	46,800	50,400	55,600
0.96	1.04	13,500	15,500	16,700	20,300	52,800	58,100	63,100	67,400
0.98	1.02	14,600	16,800	18,100	21,800	60,800	67,400	73,600	76,700
0.99	1.01	15,600	18,000	19,300	23,100	69,300	77,500	85,000	86,600
		July-August-September				October-November-December			
0.01	100	5,370	5,520	6,010	7,310	1,720	3,080	3,900	5,940
0.02	50	6,300	6,530	7,090	8,500	2,050	3,450	4,370	6,510
0.05	20	7,960	8,330	9,000	10,600	2,620	4,070	5,140	7,440
0.10	10	9,730	10,200	11,000	12,700	3,210	4,690	5,880	8,360
0.20	5	12,300	13,000	13,900	15,800	4,050	5,530	6,850	9,570
0.50	2	18,900	19,900	21,000	23,300	6,010	7,440	8,900	12,200
0.80	1.25	28,000	29,200	30,300	33,200	8,390	9,770	11,100	15,400
0.90	1.11	34,100	35,200	36,100	39,400	9,760	11,200	12,300	17,200
0.96	1.04	41,600	42,300	42,900	46,900	11,300	12,800	13,600	19,300
0.98	1.02	47,000	47,400	47,700	52,200	12,300	13,900	14,400	20,700
0.99	1.01	52,200	52,200	52,300	57,200	13,200	14,900	15,100	22,000

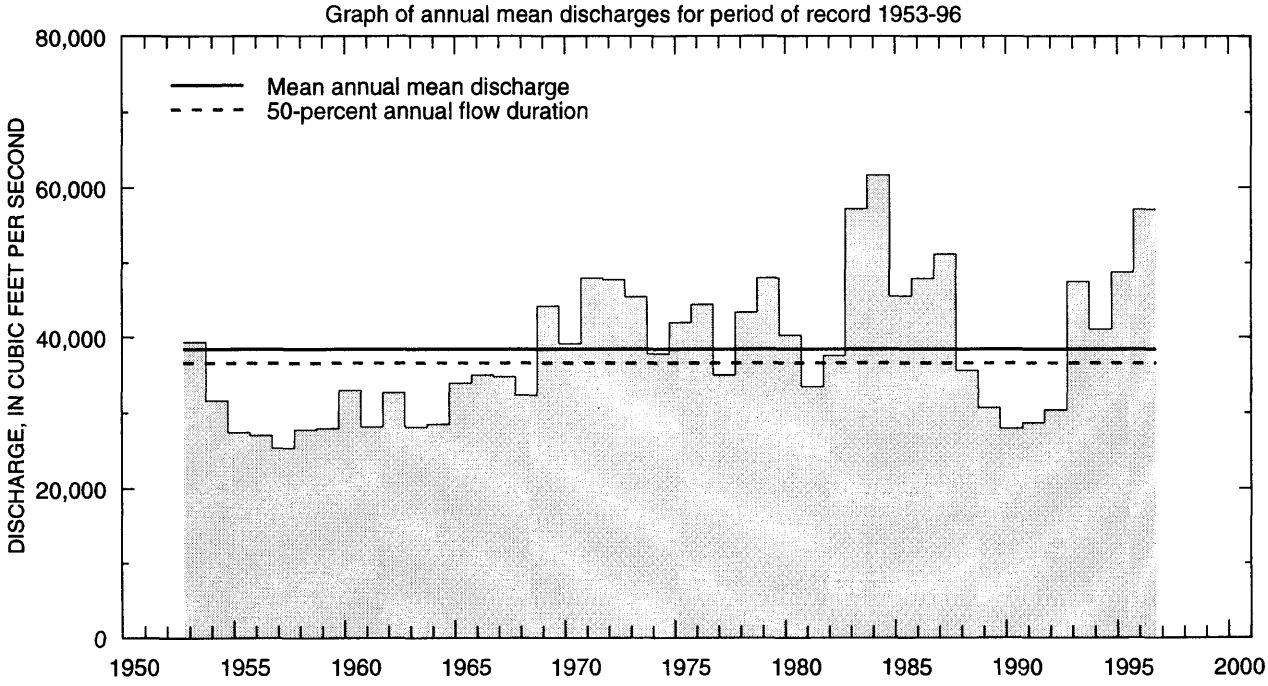
06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1953-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	69,440	1987	22,420	1962	41,640	10,730
November	68,480	1976	14,380	1962	36,860	15,440
December	52,410	1987	10,510	1956	24,180	10,470
January	39,970	1987	10,160	1957	20,440	7,456
February	48,630	1983	12,780	1957	25,540	9,127
March	66,730	1983	15,310	1957	37,470	13,070
April	95,660	1984	21,850	1957	46,480	15,040
May	85,160	1984	32,470	1955	46,500	12,080
June	117,500	1984	33,530	1958	51,530	17,000
July	116,700	1993	32,760	1961	45,760	15,110
August	71,540	1996	29,870	1955	42,190	9,644
September	66,510	1975	32,560	1958	42,140	9,650
Annual	61,700	1984	25,370	1957	38,430	9,253

Graph of annual mean discharges for period of record 1953-96



06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1953-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	15,400	11,000	5,610	6,600	10,300	12,900	17,400	30,400	30,400	30,300	29,800	30,700	10,000
95	31,000	14,400	9,650	9,860	12,500	15,500	30,100	32,000	32,600	31,800	31,400	31,700	14,000
90	32,200	15,800	12,300	11,000	13,600	18,000	32,000	32,700	34,000	32,700	32,400	32,700	17,000
85	32,700	17,500	13,700	12,300	14,800	20,200	33,000	33,900	35,000	33,700	33,600	33,200	20,800
80	33,200	19,800	14,500	13,400	15,800	22,000	34,600	35,100	35,900	34,600	34,100	33,800	24,100
75	33,800	22,200	15,300	14,200	16,800	23,800	35,400	36,100	36,800	35,500	34,800	34,400	28,600
70	35,100	26,400	16,100	15,400	18,700	25,800	36,600	37,100	38,500	36,100	35,600	35,100	31,700
60	36,800	33,800	19,600	17,500	21,300	30,100	38,800	39,300	42,100	37,800	36,900	36,900	34,200
50	38,300	37,400	22,700	19,500	23,500	35,100	41,200	42,000	45,100	40,300	38,600	38,300	36,600
40	40,000	39,500	24,800	21,200	25,900	38,200	44,700	45,200	49,200	43,200	40,000	40,400	39,100
30	42,800	42,000	27,600	23,200	28,200	42,400	48,200	49,500	54,000	48,600	45,100	44,400	42,800
25	47,500	47,500	29,600	25,100	30,300	45,200	51,100	52,800	57,500	51,800	48,600	47,700	45,800
20	51,500	50,300	32,100	26,800	33,400	47,200	54,400	56,800	62,100	54,700	50,900	50,900	49,600
15	54,500	58,800	35,000	29,100	35,900	52,800	58,900	62,100	67,300	58,800	54,900	55,200	54,000
10	59,500	61,100	39,900	31,900	38,200	59,600	68,400	66,700	76,900	64,200	58,100	58,700	59,700
5	65,800	64,100	48,100	34,800	46,500	73,000	84,000	75,700	96,000	70,800	63,900	64,600	67,300

Magnitude and frequency of instantaneous peak discharges[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	--
0.50	2	108,000
0.20	5	--
0.10	10	160,000
0.04	25	--
0.02	50	200,000
0.01	100	220,000
0.005	200	--
0.002	500	265,000

Magnitude and frequency of annual high discharges, based on period of record 1953-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	38,600	34,800	31,000	30,200
0.95	1.05	47,200	42,000	37,400	35,800
0.90	1.11	52,900	46,800	41,700	39,400
0.80	1.25	61,200	53,800	47,900	44,600
0.50	2	82,400	72,300	64,100	57,500
0.20	5	114,000	101,000	88,700	76,200
0.10	10	137,000	121,000	107,000	89,300
0.04	25	167,000	150,000	131,000	107,000
0.02	50	191,000	173,000	151,000	120,000
0.01	100	217,000	198,000	172,000	134,000
0.005	200	243,000	224,000	194,000	149,000

[a] *Final Report, Missouri River Flood Plain Study,* Missouri Basin States Association, May 1983. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

06807000 MISSOURI RIVER AT NEBRASKA CITY, NEBRASKA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1953 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3,160	3,400	4,130	6,160	7,800	8,470	8,890	9,750	14,000
0.02	50	3,620	3,920	4,780	6,850	8,550	9,330	9,840	10,800	15,200
0.05	20	4,460	4,840	5,920	8,060	9,820	10,800	11,500	12,700	17,300
0.10	10	5,390	5,870	7,160	9,320	11,100	12,300	13,100	14,500	19,300
0.20	5	6,810	7,410	8,980	11,100	13,000	14,300	15,400	17,200	22,100
0.50	2	10,800	11,700	13,800	15,800	17,700	19,400	21,100	23,500	28,800
0.80	1.25	17,600	18,700	21,000	22,500	24,300	26,200	28,800	32,000	37,700
0.90	1.11	22,800	23,900	26,000	27,100	28,800	30,700	33,900	37,600	43,500
0.96	1.04	30,300	31,300	32,700	33,200	34,700	36,400	40,300	44,600	50,800
0.98	1.02	36,600	37,300	37,900	37,900	39,200	40,600	45,100	49,700	56,100
0.99	1.01	42,500	42,600	42,700	42,800	43,700	44,800	49,800	54,700	61,400

Magnitude and frequency of seasonal low discharges, based on period of record
October 1952 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	4,070	5,100	7,000	8,380	17,700	18,700	19,900	25,300
0.02	50	4,640	5,810	7,720	9,160	19,600	20,700	21,900	26,600
0.05	20	5,650	7,050	8,950	10,500	22,600	23,800	24,900	28,600
0.10	10	6,740	8,360	10,200	11,900	25,400	26,800	27,800	30,600
0.20	5	8,350	10,300	12,000	13,800	29,000	30,500	31,500	33,300
0.50	2	12,600	15,000	16,600	18,500	36,300	37,900	39,000	39,800
0.80	1.25	19,200	21,900	23,100	25,100	43,500	45,300	46,600	48,100
0.90	1.11	23,900	26,500	27,500	29,600	47,200	49,000	50,500	53,500
0.96	1.04	30,200	32,500	33,300	35,300	51,000	52,700	54,600	60,100
0.98	1.02	35,200	36,900	37,800	39,600	53,200	55,000	57,200	65,000
0.99	1.01	40,400	41,400	42,300	44,000	55,200	56,900	59,400	69,900
		July-August-September				October-November-December			
0.01	100	14,600	19,400	25,300	28,000	2,700	4,240	6,340	7,840
0.02	50	17,100	21,300	26,300	28,700	3,380	5,100	7,260	8,830
0.05	20	21,200	24,300	27,900	29,900	4,680	6,650	8,870	10,600
0.10	10	25,000	27,100	29,500	31,200	6,160	8,350	10,600	12,400
0.20	5	29,700	30,600	31,800	33,100	8,480	10,900	13,000	15,000
0.50	2	37,900	37,900	37,900	38,200	15,000	17,500	19,200	21,700
0.80	1.25	44,100	44,700	44,700	45,600	24,900	26,900	28,000	31,400
0.90	1.11	46,300	48,300	49,400	51,000	31,900	33,200	33,800	38,100
0.96	1.04	47,900	52,000	55,400	58,000	40,700	41,000	41,300	46,800
0.98	1.02	48,600	54,200	60,000	63,600	46,600	46,600	46,900	53,500
0.99	1.01	49,000	56,100	64,500	69,400	52,200	52,200	52,500	60,300

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06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA

LOCATION.—Lat 41°23'24", long 95°22'17", in NW1/4 NE1/4 sec. 18, T76N, R39W, Pottawattamie County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on County Highway G30, 0.6 mi west of Hancock school, 3.0 mi downstream from Jim Creek, 59.6 mi upstream from confluence with East Nishnabotna River, and at mile 75.1 mi upstream from mouth of Nishnabotna River.

DRAINAGE AREA.—609 mi^2.

PERIOD OF RECORD.—October 1959 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,085.83 ft above sea level. Prior to September 15, 1980, on downstream end of right pier at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 30,100 ft^3/s, July 10, 1993, gage height, 23.52 ft; minimum daily discharge, 2.2 ft^3/s, February 8, 9, 1971.

Selected values from rating table number 14, developed October 1986

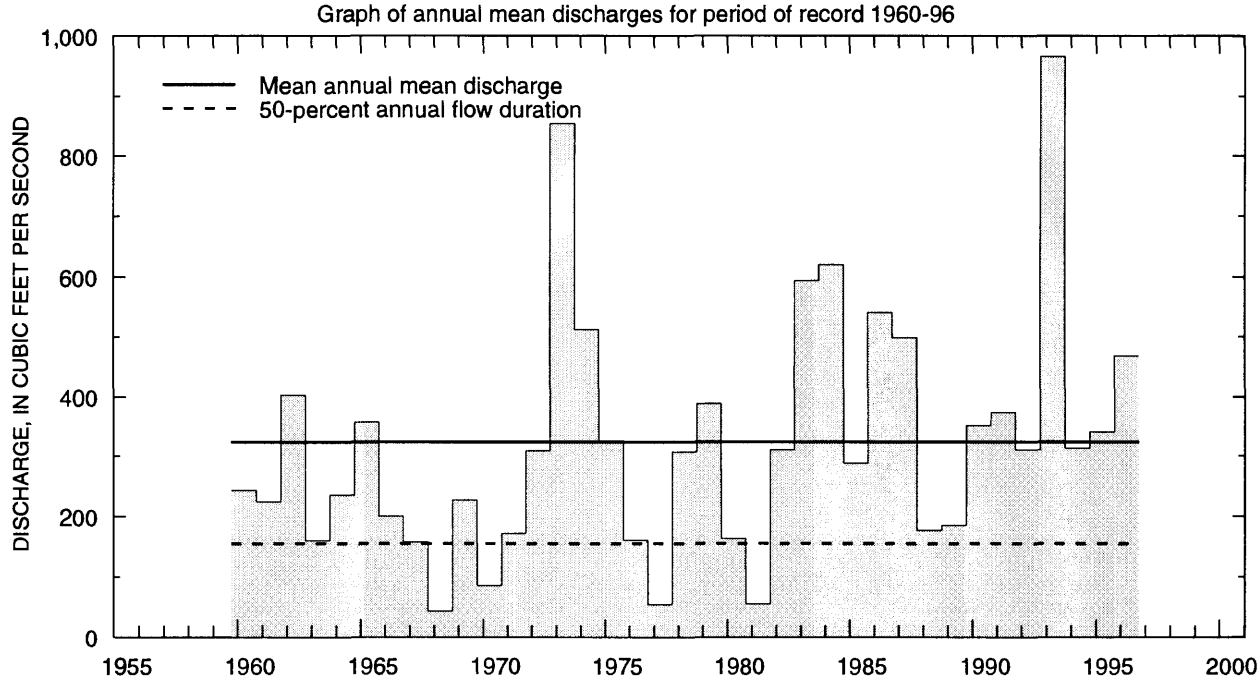
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	50.0	10.0	4,900
2.0	199	12.0	7,050
3.0	446	15.0	11,000
4.0	791	18.0	15,800
6.0	1,770	23.5	30,000
8.0	3,140		

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1960-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	998	1987	35.3	1972	195	230
November	910	1973	32.1	1971	180	185
December	628	1973	17.9	1971	156	163
January	625	1973	4.58	1971	121	128
February	993	1983	27.2	1967	265	254
March	1,946	1979	40.3	1968	547	476
April	1,295	1983	45.6	1968	412	359
May	1,586	1973	30.1	1967	485	419
June	2,019	1984	26.7	1977	564	479
July	2,925	1993	38.4	1970	408	514
August	1,073	1996	26.4	1968	240	232
September	2,412	1972	14.7	1971	310	445
Annual	966	1993	42.4	1968	323	205

Graph of annual mean discharges for period of record 1960-96



06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1960-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	12	25	13	2.7	2.7	30	25	20	14	17	15	12	13
95	26	32	16	14	15	41	40	30	30	36	24	18	22
90	34	37	21	16	25	53	52	50	71	48	34	38	35
85	41	41	28	20	35	64	69	87	99	78	48	45	44
80	46	46	35	25	45	87	100	114	136	100	59	50	53
75	50	52	40	30	52	108	125	138	161	114	70	61	68
70	63	63	45	43	64	130	147	152	187	128	82	82	86
60	95	95	63	55	90	183	178	195	255	172	121	113	116
50	112	115	88	70	110	227	228	270	320	222	157	136	155
40	139	142	110	95	170	302	334	381	413	276	187	160	205
30	163	184	158	120	221	422	478	486	575	364	230	202	280
25	196	210	190	160	250	532	558	658	639	417	263	228	340
20	269	247	246	206	280	708	674	802	762	479	303	303	407
15	351	307	340	250	350	894	798	897	937	590	374	385	513
10	474	438	383	300	453	1,220	939	1,100	1,180	783	470	519	712
5	653	565	428	350	851	2,010	1,240	1,470	1,810	1,240	690	805	1,070

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 37 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,020
0.95	1.05	2,110
0.90	1.11	3,010
0.80	1.25	4,510
0.50	2	8,990
0.20	5	16,100
0.10	10	21,100
0.04	25	27,200
0.02	50	31,600
0.01	100	35,900
0.005	200	39,900

Magnitude and frequency of annual high discharges, based on period of record 1960-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	288	189	116	75
0.95	1.05	614	410	275	192
0.90	1.11	900	601	414	296
0.80	1.25	1,410	933	652	476
0.50	2	3,140	2,000	1,370	998
0.20	5	6,560	3,900	2,460	1,720
0.10	10	9,400	5,330	3,160	2,140
0.04	25	13,500	7,240	3,960	2,580
0.02	50	17,000	8,700	4,500	2,840
0.01	100	20,600	10,200	4,980	3,050
0.005	200	24,500	11,600	5,410	3,230

06807410 WEST NISHNABOTNA RIVER AT HANCOCK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1960 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.2	2.2	2.4	2.6	3.0	5.5	8.5	12	14
0.02	50	3.3	3.3	3.6	3.9	4.6	7.6	11	15	18
0.05	20	5.7	5.8	6.3	6.9	8.1	12	17	22	25
0.10	10	9.2	9.5	10	11	13	18	24	29	35
0.20	5	16	16	17	19	23	29	36	43	53
0.50	2	40	43	45	50	58	69	79	88	113
0.80	1.25	91	98	104	113	129	150	166	179	240
0.90	1.11	131	144	153	166	187	220	242	260	355
0.96	1.04	189	211	225	242	267	322	359	386	539
0.98	1.02	234	264	283	303	329	408	460	499	704
0.99	1.01	280	320	344	367	393	502	574	627	896

Magnitude and frequency of seasonal low discharges, based on period of record October 1959 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	2.5	2.6	2.7	3.4	5.7	7.4	9.4	13
0.02	50	3.7	3.9	4.1	5.2	8.7	11	14	18
0.05	20	6.7	7.1	7.5	9.4	16	20	24	31
0.10	10	11	12	13	16	27	32	38	47
0.20	5	19	21	22	27	49	56	64	79
0.50	2	51	56	61	72	132	147	165	197
0.80	1.25	117	132	143	164	306	342	384	453
0.90	1.11	172	198	213	239	449	507	574	680
0.96	1.04	252	292	313	343	650	746	858	1,020
0.98	1.02	315	369	393	424	807	940	1,100	1,320
0.99	1.01	381	449	477	506	967	1,140	1,350	1,640
		July-August-September				October-November-December			
0.01	100	5.7	6.8	8.1	12	5.2	6.2	7.6	11
0.02	50	8.0	9.4	11	16	6.7	8.0	9.7	13
0.05	20	13	15	17	24	9.8	12	14	19
0.10	10	19	22	25	34	14	17	20	25
0.20	5	31	35	38	51	21	26	29	37
0.50	2	72	79	86	108	48	59	66	80
0.80	1.25	156	169	182	220	114	136	151	177
0.90	1.11	226	244	265	314	181	213	236	273
0.96	1.04	330	353	388	453	299	345	383	439
0.98	1.02	415	445	492	570	416	473	525	600
0.99	1.01	507	543	607	699	561	628	701	798

06808000 MULE CREEK NEAR MALVERN, IOWA

LOCATION.—Lat 40°56'36", long 95°35'42", in NE1/4 SE1/4 sec. 19, T71N, R41W, Mills County, Hydrologic Unit 10240002, on right bank 170 ft from culvert on County Highway L63, 0.2 mi downstream from unnamed tributary, 1.8 mi upstream from mouth and 4.3 mi south of Malvern.

DRAINAGE AREA.—10.6 mi^2.

PERIOD OF RECORD.—June 1954 to September 1969 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 874.20 ft above mean sea level (levels by Soil Conservation Service). Prior to October 1, 1964, water-stage recorder at site 180 ft downstream. October 1, 1964 to March 25, 1965, nonrecording gage with supplemental gages at various locations.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 2,070 ft^3/s, August 21, 1954, gage height, 15.84 ft, from rating curve extended above 510 ft^3/s on basis of stage-area measurement of peak flow; no flow January 20–25, 1956.

Selected values from rating table number 3, developed March 1961
(A discharge measurement to validate this rating has not been made since March 1961)

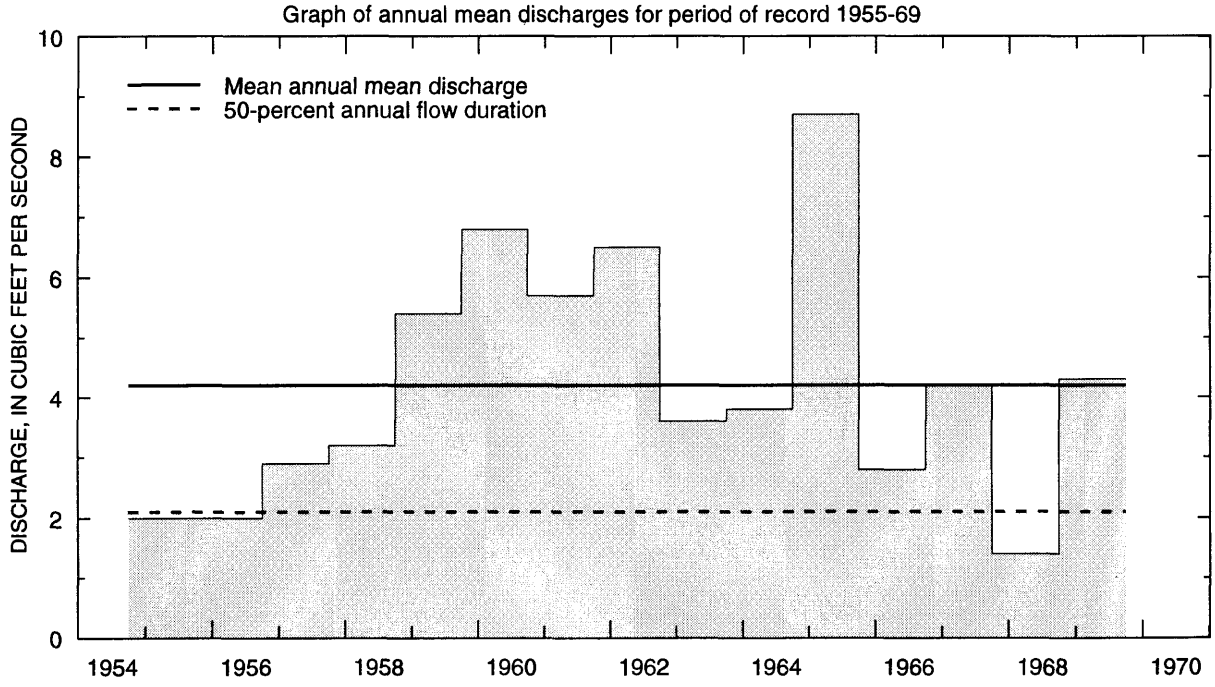
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	3.8	7.0	386
3.2	12	8.0	533
3.5	30	9.0	702
4.0	65	10.0	886
5.0	149	11.0	1,080
6.0	256		

06808000 MULE CREEK NEAR MALVERN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1955-69

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	5.57	1961	0.15	1956	2.47	1.66
November	5.91	1962	0.21	1956	2.41	1.52
December	4.98	1962	0.12	1956	1.99	1.34
January	4.51	1962	0.14	1956	1.80	1.19
February	12.7	1965	0.39	1957	4.07	3.55
March	18.6	1965	0.93	1956	5.80	4.97
April	12.7	1960	0.27	1956	3.92	3.12
May	27.3	1959	0.24	1956	7.23	7.56
June	31.4	1967	0.11	1956	7.42	8.19
July	17.2	1958	0.15	1955	5.90	5.38
August	12.3	1960	0.15	1955	3.56	3.12
September	10.4	1965	0.44	1956	4.00	3.34
Annual	8.66	1965	1.43	1968	4.21	2.04

Graph of annual mean discharges for period of record 1955-69



06808000 MULE CREEK NEAR MALVERN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1955-69

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.10	0.10	0.00	0.12	0.40	0.10	0.10	0.10	0.10	0.10	0.10	0.10
95	0.13	0.20	0.10	0.20	0.20	0.70	0.30	0.30	0.10	0.10	0.20	0.20	0.20
90	0.20	0.70	0.46	0.20	0.30	1.0	1.0	0.50	0.55	0.27	0.30	0.30	0.40
85	0.60	1.0	0.70	0.70	0.60	1.2	1.2	0.70	0.65	0.45	0.59	0.60	0.70
80	1.0	1.2	0.80	0.80	0.90	1.4	1.5	1.0	0.80	0.70	0.81	0.71	1.0
75	1.2	1.3	1.0	0.90	1.0	1.6	1.6	1.2	1.0	1.1	1.1	1.1	1.1
70	1.3	1.5	1.0	1.0	1.2	1.8	1.8	1.4	1.5	1.3	1.2	1.3	1.3
60	1.6	1.7	1.2	1.1	1.5	2.5	2.2	2.1	2.3	1.8	1.6	1.6	1.7
50	1.8	1.9	1.5	1.3	1.8	2.9	2.6	2.8	3.3	2.5	2.1	2.1	2.1
40	2.2	2.4	1.9	1.8	2.5	3.5	3.2	3.5	4.3	3.4	2.4	2.6	2.7
30	2.9	2.9	2.4	2.3	3.4	4.5	4.4	4.9	5.3	3.9	3.0	3.2	3.5
25	3.7	3.2	2.8	2.7	3.8	4.9	5.5	5.6	5.6	4.1	3.4	3.7	4.0
20	4.1	3.7	3.1	3.0	4.9	7.2	6.4	6.1	6.8	4.5	3.6	4.5	4.5
15	4.4	4.1	3.5	3.3	6.0	8.6	7.2	7.2	7.7	5.2	4.3	5.4	5.3
10	4.9	4.6	4.3	3.6	7.6	12	8.2	9.1	12	6.3	5.2	6.5	6.6
5	5.6	5.4	5.1	4.5	15	17	10	19	33	9.0	9.9	14	10

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 16 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	465
0.50	2	877
0.20	5	1,520
0.10	10	1,960
0.04	25	2,510
0.02	50	2,910
0.01	100	3,290
0.005	200	3,670

Magnitude and frequency of annual high discharges, based on period of record 1955-69

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1.7	1.6	1.4	1.4
0.95	1.05	6.6	5.1	4.1	3.4
0.90	1.11	12	8.7	6.6	5.2
0.80	1.25	24	15	11	8.0
0.50	2	62	35	23	16
0.20	5	116	60	37	24
0.10	10	145	72	44	29
0.04	25	171	84	49	32
0.02	50	185	90	51	34
0.01	100	195	94	53	36
0.005	200	202	98	54	37

06808000 MULE CREEK NEAR MALVERN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1955 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.01	0.02	0.03	0.05	0.06	0.09	0.18
0.02	50	0.00	0.00	0.01	0.04	0.05	0.08	0.09	0.14	0.25
0.05	20	0.00	0.00	0.03	0.08	0.11	0.16	0.18	0.25	0.39
0.10	10	0.06	0.07	0.08	0.14	0.19	0.28	0.32	0.41	0.58
0.20	5	0.16	0.18	0.20	0.27	0.36	0.50	0.58	0.71	0.90
0.50	2	0.55	0.59	0.74	0.79	1.0	1.3	1.5	1.7	1.9
0.80	1.25	1.4	1.4	1.7	1.8	2.2	2.6	3.0	3.1	3.5
0.90	1.11	2.1	2.2	2.4	2.6	3.2	3.5	4.0	4.0	4.6
0.96	1.04	3.2	3.3	3.4	3.6	4.3	4.5	5.1	5.1	5.9
0.98	1.02	4.2	4.2	4.2	4.3	5.0	5.1	5.8	5.9	6.9
0.99	1.01	5.2	5.2	5.2	5.2	5.8	5.9	6.4	6.6	7.9

Magnitude and frequency of seasonal low discharges, based on period of record July 1954 to September 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.01	0.03	0.06	0.03	0.05	0.05	0.06
0.02	50	0.00	0.01	0.05	0.10	0.04	0.08	0.09	0.10
0.05	20	0.00	0.05	0.11	0.19	0.09	0.14	0.17	0.21
0.10	10	0.12	0.12	0.21	0.33	0.16	0.25	0.30	0.39
0.20	5	0.31	0.31	0.42	0.58	0.32	0.46	0.55	0.74
0.50	2	0.96	1.1	1.2	1.4	0.99	1.3	1.5	2.1
0.80	1.25	1.8	2.2	2.3	2.7	2.6	3.0	3.5	4.4
0.90	1.11	2.3	2.6	3.0	3.5	4.1	4.5	5.0	6.0
0.96	1.04	2.8	2.9	3.7	4.3	6.2	6.4	6.9	7.8
0.98	1.02	3.1	3.2	4.0	4.8	7.9	7.9	8.3	8.9
0.99	1.01	3.4	3.7	4.3	5.1	9.4	9.4	9.6	9.9
		July-August-September				October-November-December			
0.01	100	0.03	0.04	0.04	0.05	0.03	0.04	0.05	0.06
0.02	50	0.05	0.06	0.07	0.09	0.05	0.07	0.08	0.10
0.05	20	0.09	0.12	0.14	0.18	0.10	0.14	0.16	0.20
0.10	10	0.14	0.21	0.23	0.31	0.18	0.24	0.29	0.35
0.20	5	0.26	0.38	0.43	0.56	0.33	0.43	0.55	0.64
0.50	2	0.70	1.0	1.1	1.5	0.92	1.1	1.4	1.6
0.80	1.25	1.7	2.3	2.5	3.1	2.1	2.3	2.7	2.9
0.90	1.11	2.6	3.1	3.5	4.1	3.0	3.1	3.4	3.7
0.96	1.04	4.0	4.1	4.8	5.3	4.1	4.1	4.1	4.4
0.98	1.02	4.8	4.9	5.7	6.1	4.7	4.7	4.7	4.8
0.99	1.01	5.5	5.6	6.5	6.8	5.2	5.2	5.3	5.3

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA

LOCATION.—Lat 40°52'23", long 95°34'48", in NE1/4 NE1/4 sec. 17, T70N, R41W, Fremont County, Hydrologic Unit 10240002, on right bank at upstream side of bridge on State Highway 184, 0.3 mi downstream from Deer Creek, 0.5 mi west of Randolph, and 16.0 mi upstream from confluence with East Nishnabotna River, and at mile 31.5 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.—1,326 mi^2.

PERIOD OF RECORD.—June 1948 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 932.99 ft above sea level. Prior to August 26, 1955, nonrecording gage with supplementary water-stage recorder operating above 8.4 ft. June 30, 1949 to August 25, 1955 at same site and datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 40,800 ft^3/s, May 26, 1987, gage height, 24.50 ft; maximum gage height, 24.8 ft, March 5, 1949, backwater from ice; minimum daily discharge, 10 ft^3/s, December 17–21, 1955.

Selected values from rating table number 11, developed October 1991

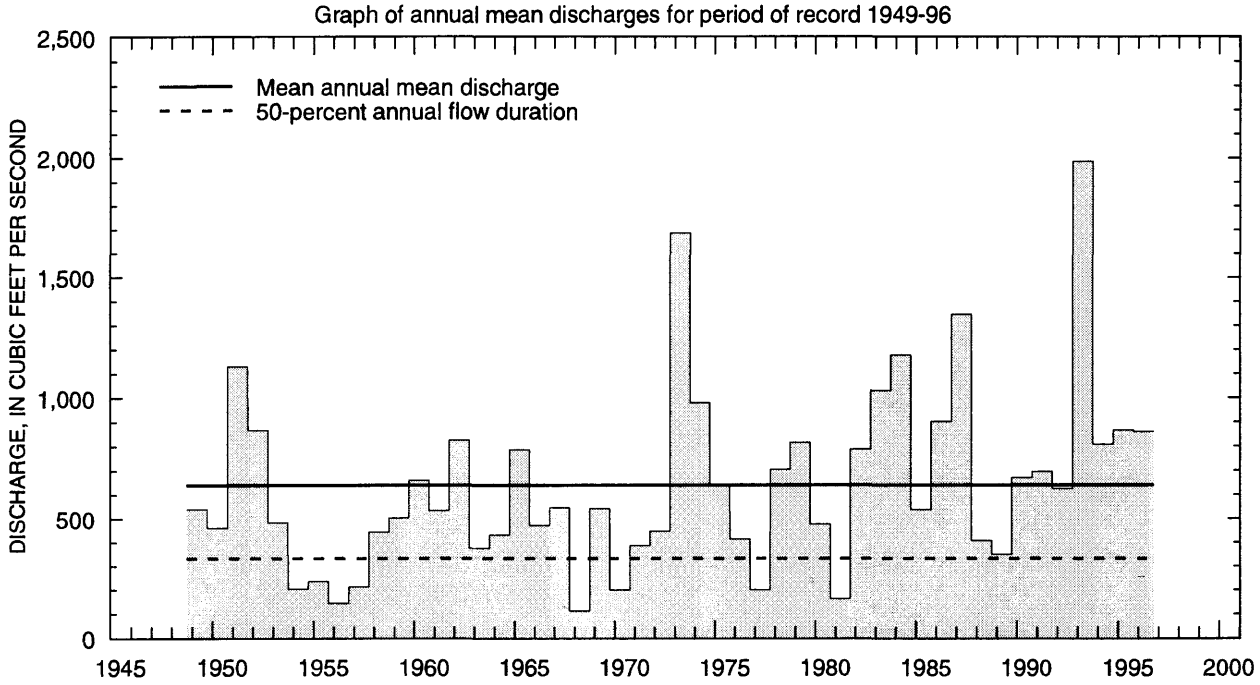
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
7.0	110	14.0	4,740
8.0	408	16.0	6,280
9.0	886	18.0	8,000
10.0	1,540	21.0	13,700
12.0	3,300	24.5	40,200

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1949-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,002	1987	27.1	1956	381	410
November	1,277	1973	33.6	1956	341	306
December	1,140	1973	20.6	1956	297	277
January	1,201	1973	17.4	1956	265	246
February	1,777	1973	19.4	1956	523	417
March	3,877	1979	67.8	1956	974	841
April	2,867	1973	42.7	1956	753	634
May	3,227	1973	97.3	1967	999	832
June	4,728	1967	65.6	1956	1,182	1,017
July	6,357	1993	71.2	1954	846	972
August	2,610	1993	30.1	1955	562	505
September	2,531	1972	41.0	1955	542	550
Annual	1,985	1993	111	1968	639	382

Graph of annual mean discharges for period of record 1949-96



06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA—Continued

Monthly and annual flow durations, based on period of record 1949-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	24	32	20	13	18	63	40	41	33	40	21	15	24
95	53	83	45	30	54	110	96	90	77	79	62	56	61
90	78	94	70	60	65	135	120	114	124	111	86	76	88
85	96	105	90	65	90	150	138	154	186	148	107	100	105
80	111	116	99	75	100	175	172	226	252	207	130	125	128
75	133	131	105	86	121	230	218	271	334	260	172	140	150
70	152	145	120	96	157	282	283	307	406	309	211	169	180
60	200	174	141	130	200	385	367	450	519	381	280	232	248
50	240	228	189	180	243	503	476	615	656	473	343	287	331
40	308	290	242	220	370	637	649	770	888	586	414	354	434
30	372	362	300	270	480	800	885	1,010	1,150	782	537	460	583
25	410	396	350	340	540	970	1,020	1,170	1,320	893	614	523	690
20	468	472	421	410	623	1,280	1,180	1,440	1,560	1,010	681	614	825
15	614	581	550	491	798	1,560	1,360	1,770	1,900	1,210	794	751	1,030
10	775	827	742	600	1,070	2,100	1,620	2,200	2,420	1,540	1,080	1,010	1,360
5	1,360	1,120	909	778	1,810	3,650	2,140	3,010	3,640	2,660	1,750	1,660	2,060

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 52 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	3,820
0.90	1.11	5,370
0.80	1.25	7,830
0.50	2	14,600
0.20	5	24,000
0.10	10	29,800
0.04	25	36,300
0.02	50	40,600
0.01	100	44,400
0.005	200	47,800

Magnitude and frequency of annual high discharges, based on period of record 1949-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	459	338	230	191
0.95	1.05	1,220	840	573	442
0.90	1.11	1,910	1,280	871	653
0.80	1.25	3,080	1,990	1,360	995
0.50	2	6,330	3,940	2,680	1,920
0.20	5	10,400	6,330	4,280	3,100
0.10	10	12,500	7,560	5,090	3,740
0.04	25	14,400	8,730	5,850	4,380
0.02	50	15,500	9,370	6,260	4,750
0.01	100	16,300	9,860	6,570	5,050
0.005	200	16,900	10,200	6,810	5,290

06808500 WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1949 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	9.2	9.8	10	12	14	18	23	30	32
0.02	50	13	13	14	16	19	24	30	37	42
0.05	20	20	21	22	24	29	36	43	53	61
0.10	10	29	31	32	35	41	51	60	71	84
0.20	5	45	48	50	54	63	77	89	101	123
0.50	2	98	105	110	118	134	160	180	197	247
0.80	1.25	199	212	225	241	269	316	350	374	476
0.90	1.11	279	298	318	341	377	441	488	519	660
0.96	1.04	392	420	450	484	532	620	687	731	923
0.98	1.02	483	518	557	602	658	766	852	910	1,140
0.99	1.01	578	620	669	727	791	922	1,030	1,100	1,370

Magnitude and frequency of seasonal low discharges, based on period of record June 1948 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	13	13	13	14	15	19	26	33
0.02	50	17	17	17	20	22	28	36	45
0.05	20	26	26	27	31	38	47	58	72
0.10	10	37	38	40	46	60	73	87	108
0.20	5	56	59	63	73	103	120	139	172
0.50	2	119	131	139	165	256	289	321	397
0.80	1.25	242	269	288	349	563	625	687	857
0.90	1.11	342	382	409	503	809	898	995	1,250
0.96	1.04	488	546	582	728	1,150	1,280	1,440	1,820
0.98	1.02	608	681	723	914	1,420	1,590	1,820	2,310
0.99	1.01	737	824	872	1,110	1,690	1,910	2,220	2,830
		July-August-September				October-November-December			
0.01	100	10	15	17	23	14	15	19	26
0.02	50	15	20	24	32	18	20	24	32
0.05	20	25	33	37	50	26	30	35	45
0.10	10	40	49	55	73	37	42	49	61
0.20	5	66	78	86	115	56	64	72	88
0.50	2	158	178	191	253	121	141	153	178
0.80	1.25	339	370	396	513	257	298	321	361
0.90	1.11	484	525	563	718	377	435	470	526
0.96	1.04	685	744	803	1,010	566	645	705	786
0.98	1.02	843	920	999	1,240	733	827	915	1,020
0.99	1.01	1,010	1,100	1,210	1,470	922	1,030	1,150	1,290

06809000 DAVIDS CREEK NEAR HAMLIN, IOWA

LOCATION.—Lat 41°40'25", long 94°48'20", in NE1/4 NE1/4 sec. 9, T79N, R34W, Audubon County, Hydrologic Unit 10240003, on left bank 20 ft downstream from bridge on State Highway 64, 5.2 mi east of Hamlin and 8.0 mi upstream from mouth.

DRAINAGE AREA.—26.0 mi^2.

PERIOD OF RECORD.—June 1952 to September 1973 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,261.54 ft above sea level. Prior to October 1, 1972, at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 22,700 ft^3/s, July 2, 1958, gage height, 24.35 ft, present datum, from rating curve extended above 500 ft^3/s on basis of slope-area measurement of peak flow; no flow many days in water years 1953–56 and 1971.

Selected values from rating table number 21, developed July 1973
(A discharge measurement to validate this rating has not been made since October 1973)

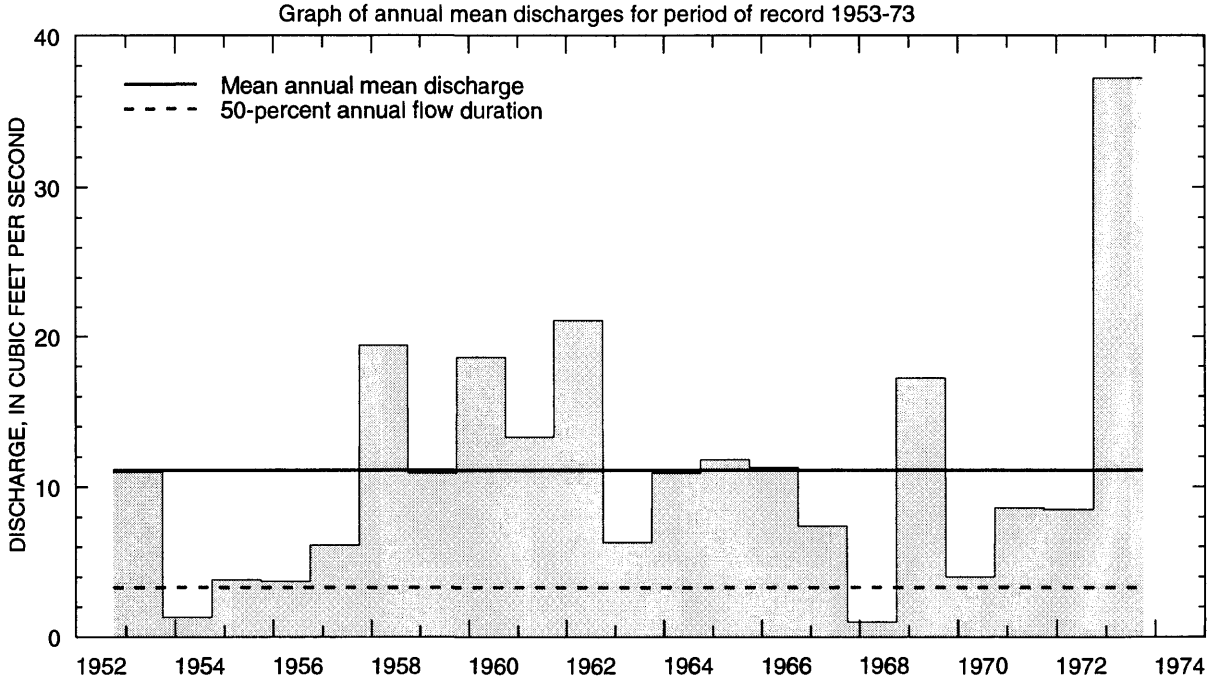
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.5	6.0	7.2	151
4.7	12	7.8	205
5.0	22	9.5	405
5.5	42	10.5	545
6.0	67	11.5	705
6.5	98		

06809000 DAVIDS CREEK NEAR HAMLIN, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-73

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	17.2	1962	0.11	1956	4.33	4.73
November	29.2	1973	0.10	1956	5.08	6.60
December	28.3	1973	0.006	1956	4.13	6.42
January	30.1	1973	0.000	1956	3.34	6.47
February	44.8	1971	0.000	1956	10.5	12.2
March	88.2	1969	0.19	1956	24.3	25.2
April	66.7	1973	0.13	1956	17.0	18.2
May	70.8	1973	0.56	1956	16.2	16.2
June	68.6	1967	0.45	1968	20.9	18.7
July	112	1958	0.18	1968	14.4	25.2
August	28.1	1960	0.016	1955	6.11	7.10
September	40.5	1972	0.030	1955	7.31	10.1
Annual	37.2	1973	0.98	1968	11.1	8.30

Graph of annual mean discharges for period of record 1953-73



06809000 DAVIDS CREEK NEAR HAMLIN, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-73

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.10	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.10	0.00	0.00	0.00
95	0.10	0.20	0.00	0.00	0.00	0.40	0.40	0.60	0.36	0.14	0.10	0.00	0.10
90	0.20	0.60	0.15	0.03	0.20	0.80	0.97	0.88	0.60	0.21	0.16	0.12	0.25
85	0.30	0.76	0.30	0.10	0.30	1.0	1.3	1.3	1.5	0.48	0.30	0.18	0.50
80	0.50	1.0	0.46	0.20	0.67	1.2	2.2	2.2	2.6	1.1	0.60	0.35	0.80
75	0.80	1.1	0.70	0.30	0.90	1.8	3.0	3.2	3.7	1.7	0.78	0.50	1.0
70	1.0	1.3	0.90	0.50	1.0	2.2	3.8	4.8	4.9	2.2	1.0	0.80	1.3
60	1.4	2.1	1.4	0.80	1.3	3.6	5.7	7.6	7.0	4.0	1.7	1.2	2.1
50	2.2	2.6	1.7	1.2	2.5	7.0	8.3	9.7	9.3	5.3	2.3	1.6	3.3
40	2.9	3.4	2.0	1.7	3.7	12	12	12	13	6.9	3.3	2.6	5.0
30	3.9	4.1	3.0	2.9	5.6	16	17	15	18	9.9	5.0	4.0	8.1
25	5.0	4.9	4.1	3.7	8.1	20	19	17	20	12	6.0	4.9	10
20	6.1	7.6	6.5	4.6	12	27	23	21	24	14	7.8	6.9	13
15	7.6	9.8	8.0	5.4	17	42	28	27	29	18	10	9.0	17
10	12	12	11	6.3	25	60	37	35	37	24	14	14	24
5	16	18	23	19	45	109	59	56	65	41	20	26	40

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 22 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	167
0.90	1.11	242
0.80	1.25	378
0.50	2	894
0.20	5	2,130
0.10	10	3,380
0.04	25	5,520
0.02	50	7,600
0.01	100	10,100
0.005	200	13,200

Magnitude and frequency of annual high discharges, based on period of record 1953-73

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	5.9	3.8	2.6	1.6
0.95	1.05	23	15	9.8	6.2
0.90	1.11	43	28	18	11
0.80	1.25	80	53	32	21
0.50	2	197	124	74	49
0.20	5	342	201	120	80
0.10	10	408	231	139	92
0.04	25	461	253	153	101
0.02	50	485	261	159	105
0.01	100	501	266	162	107
0.005	200	511	269	165	109

06809000 DAVIDS CREEK NEAR HAMLIN, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.14
0.10	10	0.00	0.00	0.00	0.00	0.03	0.06	0.15	0.20	0.30
0.20	5	0.00	0.00	0.00	0.04	0.09	0.20	0.44	0.50	0.67
0.50	2	0.39	0.40	0.42	0.43	0.53	0.94	1.2	1.9	2.4
0.80	1.25	1.2	1.3	1.3	1.4	1.8	2.6	2.9	4.2	6.2
0.90	1.11	1.7	1.8	2.0	2.3	3.0	3.8	4.5	5.5	9.0
0.96	1.04	2.2	2.4	2.7	3.5	4.8	5.3	7.0	8.0	12
0.98	1.02	2.6	2.8	3.1	4.4	6.1	6.3	9.2	10	15
0.99	1.01	2.8	3.1	3.5	5.3	6.9	7.2	12	14	17

Magnitude and frequency of seasonal low discharges, based on period of record July 1952 to September 1973

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.13
0.05	20	0.00	0.00	0.00	0.00	0.05	0.06	0.19	0.33
0.10	10	0.00	0.01	0.01	0.06	0.40	0.44	0.44	0.71
0.20	5	0.06	0.10	0.11	0.20	0.93	1.1	1.1	1.6
0.50	2	0.68	0.69	0.74	1.0	3.1	3.7	4.5	5.9
0.80	1.25	2.5	2.6	2.8	3.6	7.8	9.2	12	15
0.90	1.11	4.3	4.7	5.2	6.3	12	14	17	22
0.96	1.04	6.6	8.0	9.2	11	17	20	23	30
0.98	1.02	8.4	11	13	15	22	25	27	35
0.99	1.01	10	14	18	20	26	30	30	40
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.07
0.10	10	0.02	0.03	0.03	0.08	0.03	0.04	0.06	0.26
0.20	5	0.16	0.19	0.23	0.28	0.15	0.21	0.21	0.51
0.50	2	0.77	0.98	1.2	1.6	0.53	0.78	1.1	1.5
0.80	1.25	2.6	3.4	4.0	5.8	1.6	2.3	3.5	4.0
0.90	1.11	4.6	6.0	6.8	9.8	2.7	4.0	5.5	6.7
0.96	1.04	7.9	10	11	16	4.8	7.0	8.1	12
0.98	1.02	11	15	15	20	6.9	10	10	16
0.99	1.01	15	20	20	25	9.8	14	14	23

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA

LOCATION.—Lat 41°20'46", long 95°04'36", in NW1/4 NW1/4 sec. 35, T76N, R37W, Cass County, Hydrologic Unit 10240003, on left bank at downstream side of bridge on county highway, 1.6 mi upstream from Turkey Creek, 5.2 mi southwest of junction of U.S. Highway 6 and State Highway 83 in Atlantic, 69.1 mi upstream from confluence with West Nishnabotna River, and at mile 84.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.—436 mi^2.

PERIOD OF RECORD.—October 1960 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,105.83 ft above sea level. Prior to October 1, 1970, at site 2.2 mi upstream at datum 5.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 26,700 ft^3/s, September 12, 1972, gage height, 22.81 ft; minimum daily discharge, 2.5 ft^3/s, July 10, 1977.

Selected values from rating table number 14, developed October 1995

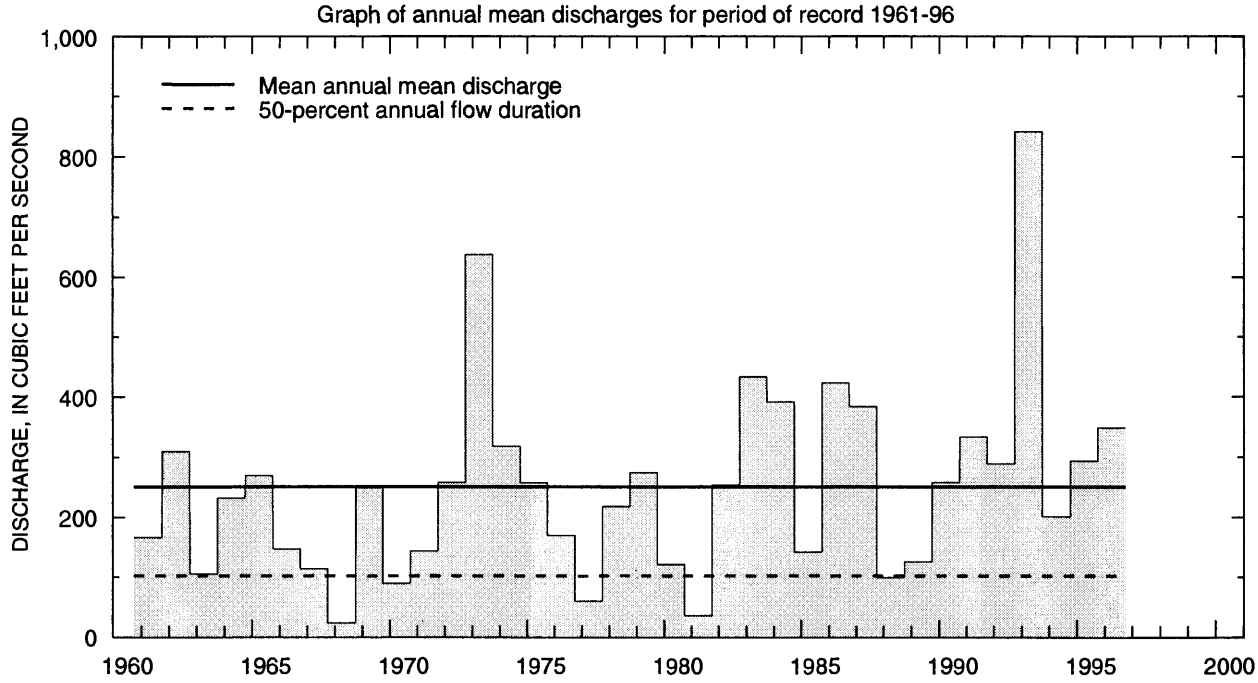
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
3.0	90.2	10.0	4,780
4.0	405	12.0	7,550
5.0	789	15.0	12,900
6.0	1,190	18.0	19,800
8.0	2,650	21.0	28,100

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1961-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,069	1987	21.0	1967	145	196
November	757	1973	20.3	1969	131	156
December	529	1993	10.6	1964	110	126
January	529	1973	7.68	1971	90.0	107
February	812	1971	18.7	1968	192	187
March	1,378	1965	28.4	1968	417	377
April	1,139	1973	27.9	1981	353	318
May	1,208	1986	15.0	1967	401	326
June	1,465	1996	23.5	1977	442	378
July	2,747	1993	15.6	1968	321	470
August	1,394	1993	13.4	1968	177	243
September	1,855	1972	14.8	1971	227	353
Annual	842	1993	23.7	1968	250	163

Graph of annual mean discharges for period of record 1961-96



06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA—Continued

Monthly and annual flow durations, based on period of record 1961-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	13	14	7.5	7.2	9.0	19	20	12	11	11	8.3	9.2	9.2
95	20	21	12	10	12	26	26	19	20	20	16	14	17
90	22	25	17	14	18	36	34	29	41	30	23	22	23
85	25	29	20	18	21	50	50	47	69	42	30	26	29
80	31	34	25	21	25	66	65	81	93	60	39	33	36
75	40	40	29	24	32	78	77	112	114	70	47	39	45
70	48	48	33	29	40	90	93	130	135	84	56	45	54
60	62	60	42	40	50	126	127	182	181	116	72	60	73
50	72	72	55	47	66	166	194	246	232	154	89	73	102
40	87	90	71	60	100	235	275	320	310	198	111	89	142
30	120	122	101	82	154	326	403	432	418	267	140	130	207
25	146	134	130	110	185	404	475	506	474	319	166	157	253
20	182	159	160	130	220	506	539	575	580	379	206	193	314
15	231	222	210	169	289	678	640	686	690	456	255	255	412
10	319	296	261	221	400	937	825	856	868	568	327	387	556
5	493	546	359	289	700	1,480	1,160	1,260	1,480	1,050	581	667	864

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 36 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,310
0.90	1.11	3,180
0.80	1.25	4,590
0.50	2	8,660
0.20	5	15,000
0.10	10	19,400
0.04	25	24,900
0.02	50	28,900
0.01	100	32,700
0.005	200	36,500

Magnitude and frequency of annual high discharges, based on period of record 1961-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	147	86	56	46
0.95	1.05	442	282	193	149
0.90	1.11	737	482	332	250
0.80	1.25	1,280	844	581	428
0.50	2	2,990	1,920	1,280	917
0.20	5	5,540	3,270	2,050	1,460
0.10	10	7,030	3,920	2,370	1,690
0.04	25	8,580	4,490	2,610	1,870
0.02	50	9,500	4,770	2,710	1,950
0.01	100	10,200	4,970	2,780	2,000
0.005	200	10,900	5,100	2,820	2,030

06809210 EAST NISHNABOTNA RIVER NEAR ATLANTIC, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1961 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	2.3	3.0	3.8	4.0	4.6	5.5	7.3	9.4	11
0.02	50	3.2	3.9	4.9	5.1	5.9	7.1	9.2	12	13
0.05	20	5.0	5.9	7.1	7.5	8.7	10	13	16	18
0.10	10	7.4	8.4	9.9	10	12	14	18	21	25
0.20	5	12	13	15	16	18	21	26	29	36
0.50	2	27	28	31	33	38	45	53	58	75
0.80	1.25	56	59	62	67	78	94	109	120	165
0.90	1.11	81	85	90	97	112	137	159	177	254
0.96	1.04	116	126	132	142	163	206	240	271	408
0.98	1.02	146	162	169	181	208	267	314	359	558
0.99	1.01	177	202	210	225	257	337	399	464	744

Magnitude and frequency of seasonal low discharges, based on period of record October 1960 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.8	4.2	4.4	5.9	3.8	5.0	5.9	7.3
0.02	50	4.9	5.4	5.7	7.4	5.8	7.6	8.9	11
0.05	20	7.2	7.9	8.3	10	11	14	16	20
0.10	10	10	11	12	14	18	23	26	33
0.20	5	15	17	18	21	32	40	45	57
0.50	2	34	38	40	47	86	103	117	148
0.80	1.25	73	86	93	111	198	228	266	336
0.90	1.11	110	132	143	179	288	326	389	488
0.96	1.04	168	210	229	305	413	458	562	700
0.98	1.02	222	284	311	434	510	559	700	867
0.99	1.01	284	374	410	601	608	659	842	1,040
		July-August-September				October-November-December			
0.01	100	3.1	6.8	7.4	11	4.9	4.9	5.4	7.3
0.02	50	4.3	8.3	9.0	13	6.0	6.2	6.9	9.0
0.05	20	7.0	11	12	18	8.4	9.0	9.9	12
0.10	10	11	15	16	23	11	13	14	17
0.20	5	17	22	24	32	16	19	20	24
0.50	2	42	45	49	63	35	41	45	52
0.80	1.25	93	97	107	135	77	92	101	115
0.90	1.11	137	147	165	206	119	142	156	177
0.96	1.04	202	232	265	330	193	225	249	287
0.98	1.02	258	314	364	453	265	304	338	395
0.99	1.01	317	415	487	607	355	400	447	529

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IOWA

LOCATION.—Lat 41°00'31", long 95°14'29", in NW1/4 SE1/4 sec. 29, T72N, R38W, Montgomery County, Hydrologic Unit 10240003, on upstream side of Coolbaugh Street and 200 ft left of left end of Coolbaugh Street bridge in Red Oak, 0.2 mi upstream from Red Oak Creek, 38.0 mi upstream from confluence with West Nishnabotna River, and at mile 53.6 upstream from mouth of Nishnabotna River.

DRAINAGE AREA.—894 mi^2.

PERIOD OF RECORD.—May 1918 to July 1925, May 1936 to September 1996. Monthly discharges only for some periods, published in WSP 1310.

GAGE.—Water-stage recorder. Datum of gage is 1,005.45 ft above sea level. Prior to July 5, 1925, nonrecording gage at present site at datum 4.60 ft higher. May 29, 1936, to November 13, 1952, nonrecording gage with supplementary water-stage recorder in operation above 3.2 ft gage height. July 30, 1939, to November 13, 1952, and November 14, 1952 to June 13, 1966, water-stage recorder at site 0.5 mi upstream at datum 5.00 ft higher. June 14, 1966, to September 30, 1969, at present site at datum 5.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 38,000 ft^3/s, September 13, 1972, gage height, 27.43 ft; maximum gage height, 28.23 ft, June 13, 1947, present datum; minimum daily discharge, 6.0 ft^3/s, August 18, 1936.

Selected values from rating table number 20, developed March 1993

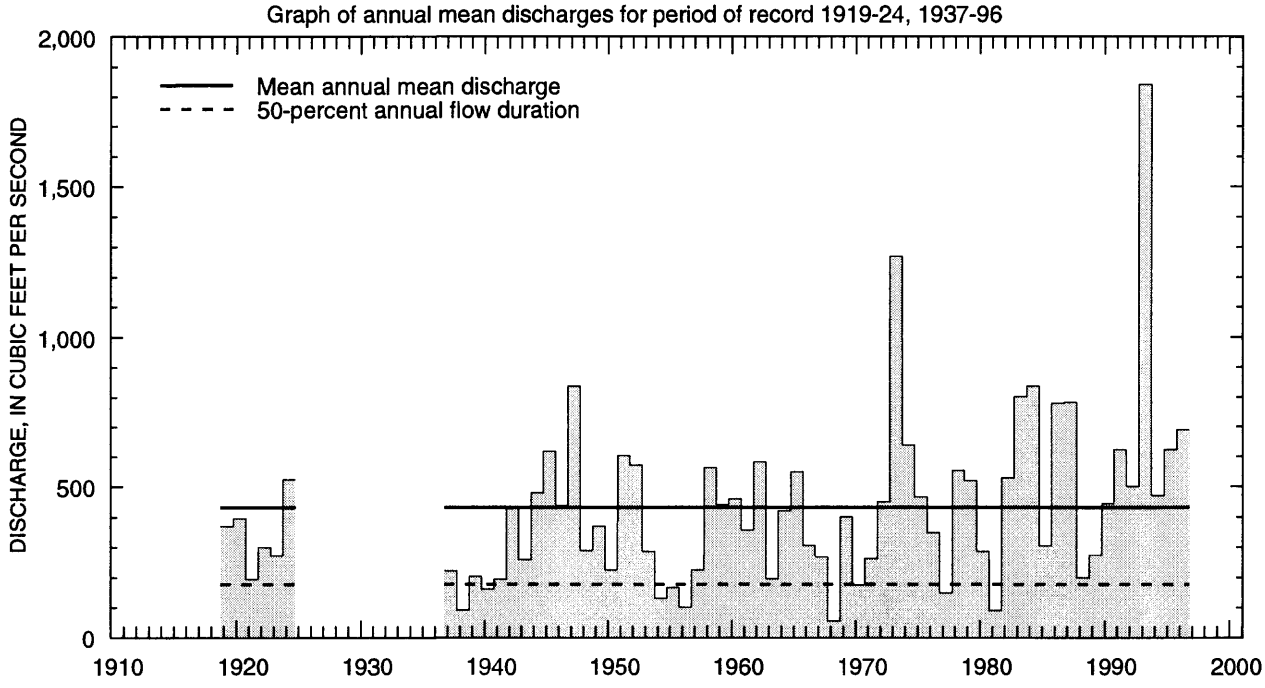
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	133	15.0	8,220
6.0	428	18.0	13,200
7.0	830	21.0	19,300
9.0	1,960	24.0	26,700
12.0	4,480	27.0	38,000

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1919-24, 1937-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,816	1987	16.5	1938	225	288
November	1,335	1973	19.9	1940	207	230
December	1,038	1993	14.6	1938	166	197
January	1,078	1973	12.3	1940	156	185
February	1,438	1973	17.2	1940	355	314
March	2,596	1965	32.3	1938	688	591
April	2,194	1973	30.4	1956	552	513
May	2,440	1973	35.2	1939	694	639
June	4,891	1947	40.5	1968	860	852
July	6,971	1993	29.2	1954	547	898
August	2,821	1993	35.2	1955	362	398
September	3,074	1972	14.9	1937	368	513
Annual	1,842	1993	54.9	1968	431	286

Graph of annual mean discharges for period of record 1919-24, 1937-96



06809500 EAST NISHNABOTNA RIVER AT RED OAK, IOWA—Continued

Monthly and annual flow durations, based on period of record 1919-24, 1937-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	16	19	14	12	13	32	25	26	27	21	23	15	16
95	25	30	22	17	22	58	54	46	42	31	34	26	28
90	33	40	30	23	32	73	69	61	71	54	48	35	41
85	42	48	38	28	45	98	86	80	97	72	59	44	53
80	49	58	46	35	58	115	102	107	130	95	74	55	65
75	56	68	52	40	70	142	127	147	178	124	93	68	78
70	71	76	60	50	80	169	160	180	227	151	110	84	94
60	100	100	74	66	115	231	219	268	307	206	145	115	130
50	124	129	95	80	150	296	290	380	411	264	178	145	178
40	152	156	112	110	200	394	398	505	562	342	223	185	243
30	198	193	150	150	271	534	575	651	764	458	290	250	342
25	226	227	178	165	321	614	679	788	896	526	340	290	419
20	263	269	214	200	390	776	830	969	1,110	617	404	343	516
15	353	321	280	260	500	1,030	997	1,220	1,380	744	486	451	661
10	485	440	380	390	749	1,480	1,300	1,620	1,930	964	671	680	929
5	784	686	520	551	1,320	2,630	1,900	2,320	3,140	1,670	1,200	1,220	1,550

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 69 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,500
0.90	1.11	3,500
0.80	1.25	5,120
0.50	2	9,800
0.20	5	17,000
0.10	10	21,900
0.04	25	27,800
0.02	50	32,100
0.01	100	36,200
0.005	200	40,100

Magnitude and frequency of annual high discharges, based on period of record 1919-24, 1937-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	330	226	175	145
0.95	1.05	982	649	459	343
0.90	1.11	1,600	1,040	709	512
0.80	1.25	2,670	1,700	1,120	786
0.50	2	5,610	3,450	2,210	1,530
0.20	5	9,010	5,380	3,440	2,490
0.10	10	10,600	6,230	4,020	3,010
0.04	25	11,800	6,910	4,510	3,520
0.02	50	12,500	7,240	4,760	3,820
0.01	100	12,900	7,450	4,940	4,060
0.005	200	13,200	7,590	5,070	4,250

06809500 EAST NISHNABOTNA RIVER AT RED OAK, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1919 to March 1924, April 1937 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	6.0	6.5	7.1	8.4	10	12	15	16	18
0.02	50	7.6	8.2	8.9	10	12	15	18	20	23
0.05	20	11	11	12	14	17	21	25	28	34
0.10	10	15	16	17	19	22	27	34	37	47
0.20	5	21	23	24	27	32	39	47	53	69
0.50	2	43	45	48	53	62	76	90	103	142
0.80	1.25	88	92	97	104	121	149	174	197	278
0.90	1.11	127	132	140	150	174	213	244	275	391
0.96	1.04	187	195	206	221	256	311	351	393	555
0.98	1.02	241	251	264	285	329	398	444	493	691
0.99	1.01	302	314	331	358	413	497	548	604	840

Magnitude and frequency of seasonal low discharges, based on period of record July 1918 to September 1924, April 1925 to June 1925, July 1936 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	7.4	7.9	8.3	9.6	10	12	15	19
0.02	50	9.4	9.9	10	12	14	17	21	25
0.05	20	13	14	15	17	22	27	32	40
0.10	10	18	19	20	24	34	40	47	59
0.20	5	27	29	30	36	55	63	74	95
0.50	2	56	62	66	80	130	149	176	228
0.80	1.25	117	137	148	189	289	339	405	530
0.90	1.11	173	210	229	302	428	511	621	815
0.96	1.04	264	335	368	504	639	782	971	1,280
0.98	1.02	347	454	503	707	819	1,020	1,290	1,700
0.99	1.01	445	600	669	965	1,020	1,300	1,660	2,180
		July-August-September				October-November-December			
0.01	100	5.7	7.9	10	13	7.8	8.8	10	15
0.02	50	7.9	10	13	17	9.7	11	13	18
0.05	20	12	16	19	25	14	15	17	24
0.10	10	19	22	27	35	18	21	24	31
0.20	5	30	34	40	53	27	31	34	43
0.50	2	68	76	85	116	56	65	71	85
0.80	1.25	148	164	182	250	121	142	155	178
0.90	1.11	215	242	270	371	183	216	236	269
0.96	1.04	316	363	409	562	288	341	374	426
0.98	1.02	400	471	534	733	389	461	507	579
0.99	1.01	491	592	679	929	510	606	669	768

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IOWA

LOCATION.—Lat 40°37'57", long 95°37'32", in SW1/4 SE1/4 sec. 11, T67N, R42W, Fremont County, Hydrologic Unit 10240004, on left bank 1.7 mi downstream from confluence of East Nishnabotna and West Nishnabotna Rivers, 2 mi northeast of Hamburg, and at mile 13.8.

DRAINAGE AREA.—2,806 mi^2.

PERIOD OF RECORD.—March 1922 to September 1923, October 1928 to September 1996. Monthly discharge only for some periods published in WSP 1310.

GAGE.—Water-stage recorder. Datum of gage is 894.17 ft above sea level. See WSP 1730 for history of changes prior to November 16, 1950.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 55,500 ft^3/s, June 24, 1947, maximum gage height, 30.56 ft, July 25, 1993; minimum daily discharge, 4.5 ft^3/s, August 30, 1934.

Selected values from rating table number 14, developed February 1996

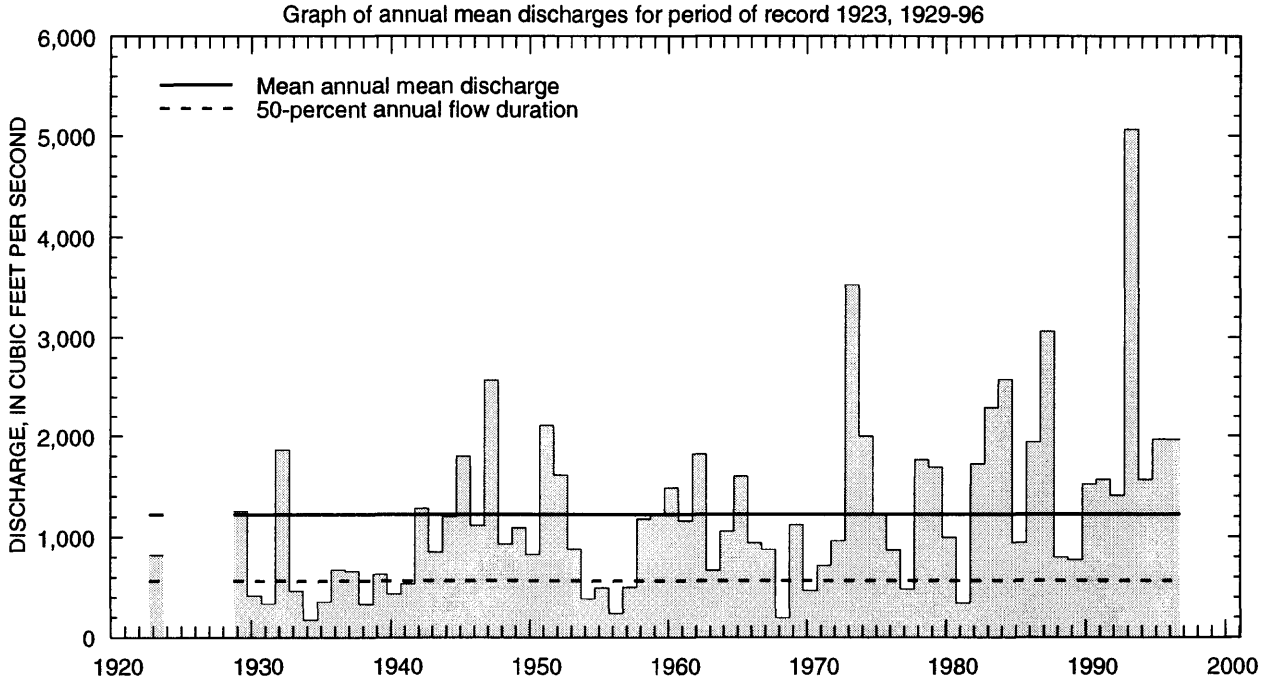
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
8.5	401	18.0	7,760
9.0	670	21.0	11,900
10.0	1,300	24.0	18,600
12.0	2,470	27.0	28,100
15.0	4,800	30.6	43,000

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1923, 1929-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	5,004	1987	39.5	1938	669	823
November	3,083	1973	42.9	1938	649	647
December	2,557	1973	27.1	1938	543	563
January	3,585	1973	21.3	1940	553	615
February	4,720	1973	30.3	1940	1,010	900
March	7,229	1979	115	1931	1,853	1,566
April	5,866	1973	89.7	1956	1,406	1,315
May	6,621	1995	68.2	1934	1,831	1,751
June	16,430	1947	151	1956	2,454	2,577
July	17,780	1993	52.8	1936	1,612	2,267
August	6,266	1993	16.8	1934	1,056	1,024
September	7,385	1993	44.1	1937	1,021	1,272
Annual	5,062	1993	170	1934	1,221	844

Graph of annual mean discharges for period of record 1923, 1929-96



06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IOWA—Continued

Monthly and annual flow durations, based on period of record 1923, 1929-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	27	45	23	24	25	79	68	58	63	43	15	28	30
95	49	72	51	50	54	146	113	102	122	92	76	55	74
90	85	110	84	70	102	220	204	158	196	144	110	90	116
85	117	162	111	100	146	280	238	211	281	206	153	123	160
80	148	191	151	128	170	344	276	294	359	260	199	165	200
75	194	216	180	159	194	420	344	380	462	331	256	216	240
70	231	238	200	180	230	495	445	495	638	433	322	260	290
60	306	319	240	240	378	739	623	730	965	661	457	353	405
50	382	400	304	320	470	950	815	1,020	1,290	872	610	472	565
40	471	501	400	400	680	1,240	1,080	1,380	1,720	1,150	779	592	795
30	622	659	550	532	958	1,650	1,600	1,860	2,450	1,520	980	787	1,100
25	752	800	660	640	1,100	2,000	1,930	2,190	2,870	1,770	1,150	940	1,300
20	870	912	838	800	1,300	2,470	2,270	2,640	3,470	2,060	1,390	1,130	1,620
15	1,100	1,100	1,060	1,000	1,700	3,190	2,750	3,300	4,390	2,470	1,680	1,420	2,070
10	1,410	1,430	1,310	1,400	2,420	4,340	3,260	4,400	5,720	3,170	2,220	2,190	2,790
5	2,320	2,160	1,820	1,800	3,740	6,680	4,440	6,180	8,730	5,050	3,820	3,760	4,410

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 74 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	5,740
0.90	1.11	7,470
0.80	1.25	10,000
0.50	2	16,400
0.20	5	24,600
0.10	10	29,400
0.04	25	34,700
0.02	50	38,100
0.01	100	41,200
0.005	200	44,000

Magnitude and frequency of annual high discharges, based on period of record 1923, 1929-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	890	680	508	382
0.95	1.05	2,290	1,650	1,160	843
0.90	1.11	3,530	2,480	1,710	1,230
0.80	1.25	5,590	3,870	2,620	1,870
0.50	2	11,200	7,780	5,200	3,710
0.20	5	18,200	13,000	8,810	6,390
0.10	10	21,800	15,900	11,000	8,060
0.04	25	25,100	18,800	13,300	9,960
0.02	50	26,900	20,600	14,800	11,200
0.01	100	28,300	22,000	16,000	12,300
0.005	200	29,400	23,200	17,100	13,300

06810000 NISHNABOTNA RIVER ABOVE HAMBURG, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1922 to March 1923, April 1929 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	5.1	6.5	7.9	10	13	22	33	37	43
0.02	50	8.0	9.9	12	15	19	30	43	49	58
0.05	20	15	18	21	25	32	46	63	73	90
0.10	10	26	30	34	40	50	68	89	103	130
0.20	5	48	53	59	68	82	108	134	155	200
0.50	2	136	145	158	173	200	246	287	329	430
0.80	1.25	326	347	376	399	444	530	597	670	862
0.90	1.11	485	519	567	594	649	773	867	955	1,210
0.96	1.04	709	769	852	881	949	1,140	1,280	1,380	1,690
0.98	1.02	886	973	1,090	1,120	1,200	1,440	1,640	1,740	2,080
0.99	1.01	1,070	1,190	1,350	1,380	1,460	1,780	2,040	2,130	2,480

Magnitude and frequency of seasonal low discharges, based on period of record April 1922 to September 1923, October 1928 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	13	16	17	22	21	26	32	45
0.02	50	18	22	24	30	31	38	46	64
0.05	20	30	35	39	48	55	65	78	104
0.10	10	47	54	59	73	88	103	122	159
0.20	5	78	88	97	120	151	175	204	263
0.50	2	198	218	238	296	395	449	520	653
0.80	1.25	472	512	552	699	937	1,060	1,220	1,530
0.90	1.11	725	786	840	1,070	1,420	1,600	1,850	2,330
0.96	1.04	1,130	1,220	1,290	1,680	2,140	2,430	2,820	3,590
0.98	1.02	1,480	1,620	1,690	2,220	2,750	3,140	3,650	4,700
0.99	1.01	1,890	2,070	2,150	2,840	3,420	3,910	4,570	5,950
		July-August-September				October-November-December			
0.01	100	6.4	10	15	20	11	13	17	32
0.02	50	10	16	22	30	15	18	24	41
0.05	20	21	29	39	53	25	31	39	61
0.10	10	38	49	62	87	39	48	59	86
0.20	5	72	88	107	151	65	81	97	129
0.50	2	216	244	278	390	171	208	237	283
0.80	1.25	534	588	647	886	426	503	547	614
0.90	1.11	799	884	967	1,290	673	775	827	917
0.96	1.04	1,170	1,320	1,440	1,870	1,080	1,210	1,260	1,400
0.98	1.02	1,450	1,670	1,830	2,320	1,460	1,590	1,640	1,840
0.99	1.01	1,740	2,040	2,250	2,790	1,900	2,020	2,070	2,350

06811840 TARKIO RIVER AT STANTON, IOWA

LOCATION.—Lat 40°58'52", long 95°06'32", in NW1/4 SW1/4 sec. 4, T71N, R37W, Montgomery County, Hydrologic Unit 10240005, on right bank 10 ft downstream from bridge on County Highway H42, 0.1 mi downstream from Little Tarkio Creek and 0.5 mi west of Stanton.

DRAINAGE AREA.—49.3 mi^2.

PERIOD OF RECORD.—October 1957 to September 1991 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 1,104.67 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 22,500 ft^3/s, June 9, 1967, gage height, 28.56 ft, from rating curve extended above 1,600 ft^3/s on basis of slope-area measurement of peak flow; no flow at times many years.

Selected values from rating table number 14, developed October 1989
(A discharge measurement to validate this rating has not been made since March 1992)

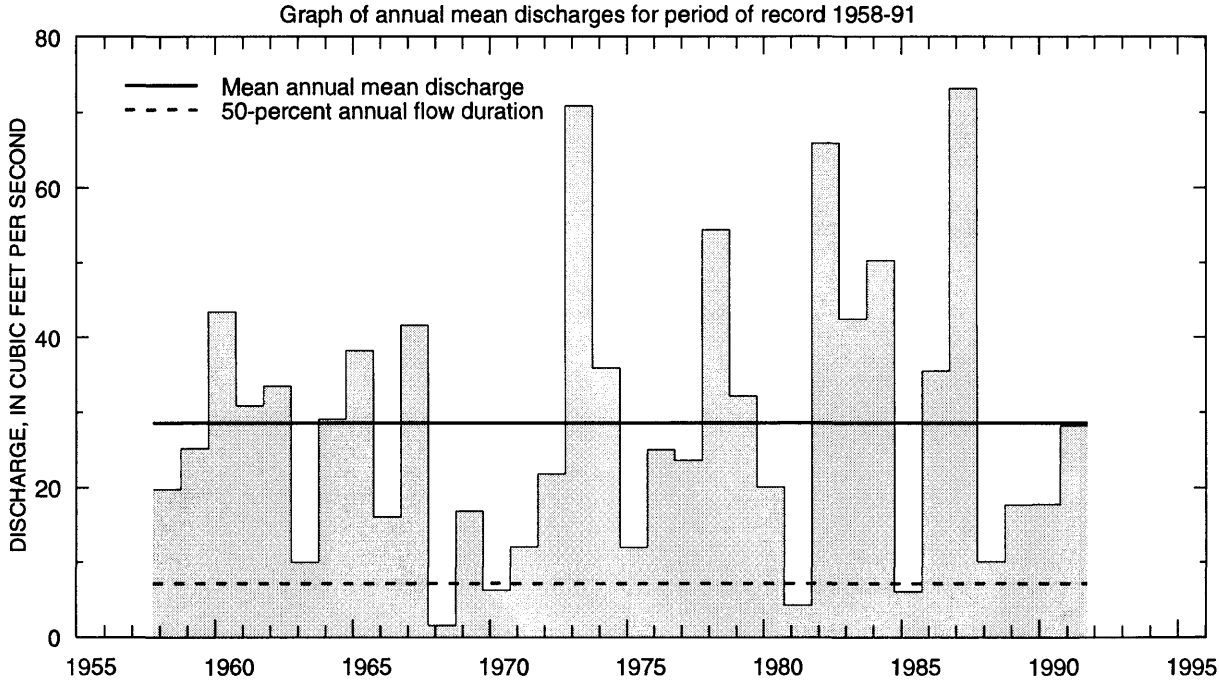
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.0	5.43	15.0	2,620
9.5	72.1	18.0	4,780
10.0	190	21.0	7,330
11.0	515	24.0	10,500
13.0	1,440	28.0	20,600

06811840 TARKIO RIVER AT STANTON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1958-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	98.7	1987	0.061	1989	15.1	24.5
November	97.9	1978	0.26	1969	14.7	22.5
December	56.5	1973	0.008	1977	10.8	13.4
January	57.0	1973	0.000	1977	9.46	13.5
February	113	1973	0.79	1989	23.3	27.0
March	196	1979	1.59	1968	44.2	45.1
April	129	1984	3.18	1968	40.6	37.0
May	232	1982	1.10	1989	51.6	55.3
June	458	1967	0.25	1977	63.8	87.1
July	92.9	1986	0.066	1977	26.3	24.9
August	175	1987	0.078	1988	18.5	35.3
September	152	1977	0.14	1968	25.1	35.4
Annual	73.2	1987	1.46	1968	28.6	18.6

Graph of annual mean discharges for period of record 1958-91



06811840 TARKIO RIVER AT STANTON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1958-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.01	0.13	0.00	0.00	0.00	0.53	0.56	0.39	0.04	0.00	0.00	0.00	0.00
95	0.10	0.40	0.20	0.09	0.36	1.3	1.7	1.1	0.57	0.04	0.02	0.01	0.15
90	0.26	0.85	0.42	0.40	0.68	1.7	2.9	2.5	1.2	0.20	0.07	0.06	0.60
85	0.70	1.4	0.81	0.65	1.1	2.4	4.1	3.5	2.3	0.58	0.20	0.31	1.1
80	1.0	1.7	1.4	0.90	1.5	3.3	5.3	4.3	3.6	1.9	0.51	0.50	1.7
75	1.5	2.5	1.8	1.1	2.0	4.9	6.2	5.6	5.4	3.7	0.90	0.80	2.3
70	1.9	3.4	2.2	1.5	2.5	7.2	7.4	7.1	7.6	5.3	1.5	1.2	3.1
60	3.1	4.4	3.2	2.4	3.6	11	11	13	13	8.4	3.0	2.1	5.0
50	4.8	5.4	5.0	3.3	5.0	15	18	21	20	12	4.6	3.4	7.1
40	6.0	7.1	7.0	5.0	7.1	21	28	33	26	16	6.0	5.6	12
30	10	11	10	7.0	12	34	37	44	37	22	8.6	10	19
25	17	15	13	9.0	16	40	46	52	44	27	10	16	25
20	21	20	16	12	30	54	57	64	53	31	13	24	32
15	25	27	23	16	43	69	72	80	65	38	17	35	41
10	37	36	28	23	55	90	94	106	88	50	21	49	59
5	57	62	38	34	93	171	146	157	196	79	38	82	94

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 39 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	402
0.90	1.11	659
0.80	1.25	1,150
0.50	2	2,910
0.20	5	6,310
0.10	10	8,900
0.04	25	12,300
0.02	50	14,900
0.01	100	17,400
0.005	200	19,800

Magnitude and frequency of annual high discharges, based on period of record 1958-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	14	8.0	5.7	4.6
0.95	1.05	51	29	20	15
0.90	1.11	91	52	35	26
0.80	1.25	171	98	65	45
0.50	2	442	253	160	108
0.20	5	856	484	291	197
0.10	10	1,090	612	359	246
0.04	25	1,330	738	423	294
0.02	50	1,470	807	457	321
0.01	100	1,580	860	481	342
0.005	200	1,660	901	500	358

06811840 TARKIO RIVER AT STANTON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1958 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.14	0.26
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.21	0.37
0.05	20	0.00	0.00	0.00	0.00	0.02	0.10	0.22	0.38	0.65
0.10	10	0.00	0.00	0.00	0.00	0.07	0.24	0.40	0.63	1.1
0.20	5	0.00	0.00	0.00	0.03	0.20	0.53	0.79	1.2	1.9
0.50	2	0.16	0.20	0.29	0.47	1.0	2.0	2.7	3.5	5.6
0.80	1.25	1.1	1.4	1.8	2.4	3.8	6.4	8.4	10	16
0.90	1.11	2.7	3.3	4.0	5.0	7.0	11	15	18	28
0.96	1.04	6.8	8.0	8.7	9.8	13	21	26	31	51
0.98	1.02	12	14	14	15	18	31	37	44	73
0.99	1.01	22	22	22	22	25	43	50	60	102

Magnitude and frequency of seasonal low discharges, based on period of record October 1957 to September 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.01	0.03	0.06	0.15
0.02	50	0.00	0.00	0.00	0.00	0.03	0.06	0.13	0.27
0.05	20	0.00	0.00	0.09	0.47	0.09	0.18	0.34	0.65
0.10	10	0.04	0.12	0.21	0.72	0.23	0.43	0.76	1.3
0.20	5	0.23	0.35	0.49	1.1	0.65	1.1	1.8	3.0
0.50	2	1.3	1.6	1.9	2.9	3.4	5.2	7.3	11
0.80	1.25	5.2	6.0	6.7	8.5	12	16	21	35
0.90	1.11	11	11	13	16	21	26	33	56
0.96	1.04	21	22	24	33	34	38	48	89
0.98	1.02	34	35	37	54	44	47	60	116
0.99	1.01	51	52	53	87	54	55	70	144
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.07	0.00	0.00	0.03	0.11
0.10	10	0.00	0.00	0.01	0.16	0.00	0.08	0.13	0.33
0.20	5	0.00	0.00	0.09	0.39	0.08	0.27	0.46	0.86
0.50	2	0.37	0.62	0.88	1.9	0.87	1.6	2.8	3.7
0.80	1.25	2.2	3.7	4.6	7.4	5.1	7.0	10	12
0.90	1.11	4.8	7.8	9.6	14	12	14	17	20
0.96	1.04	10	15	19	27	26	26	26	34
0.98	1.02	16	22	29	40	33	33	33	45
0.99	1.01	25	31	41	55	40	40	40	58

06813500 MISSOURI RIVER AT RULO, NEBRASKA

LOCATION.—Lat 40°03'13", long 95°25'19", in NW1/4 NW1/4 sec. 17, T1N, R18E sixth principal meridian, Richardson County, Nebraska, Hydrologic Unit 10240005, on right bank at downstream side of bridge on U.S. Highway 159 at Rulo, 3.2 mi upstream from Big Nemaha River, and at mile 498.0.

DRAINAGE AREA.—414,900 mi^2 approximately. The 3,959 mi^2 in Great Divide Basin are not included.

PERIOD OF RECORD.—October 1949 to September 1996 in reports of U.S. Geological Survey. Gage height record collected at site 80 ft upstream January 1886 to December 1899 published in reports of Missouri River Commission; September 1929 to September 1950 in files of Kansas City office of U.S. Army Corps of Engineers.

GAGE.—Water-stage recorder. Datum of gage is 837.23 ft above sea level. October 1949 to September 12, 1950, nonrecording gage at site 80 ft upstream and September 13, 1950 to April 19, 1983, recording gage on downstream end of middle pier, all at same datum.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 358,000 ft^3/s, April 22, 1952, gage height, 25.60 ft; minimum daily discharge, 4,420 ft^3/s, January 13, 1957.

REMARKS.—Flow regulated by upstream main-stem reservoirs. Significant regulation is assumed to have begun in 1953.

Selected values from rating table number 5, developed January 1989

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	8,500	12.0	50,800
2.0	11,300	15.0	69,700
4.0	17,500	18.0	92,900
6.0	25,200	21.0	120,000
9.0	37,400	24.5	264,000

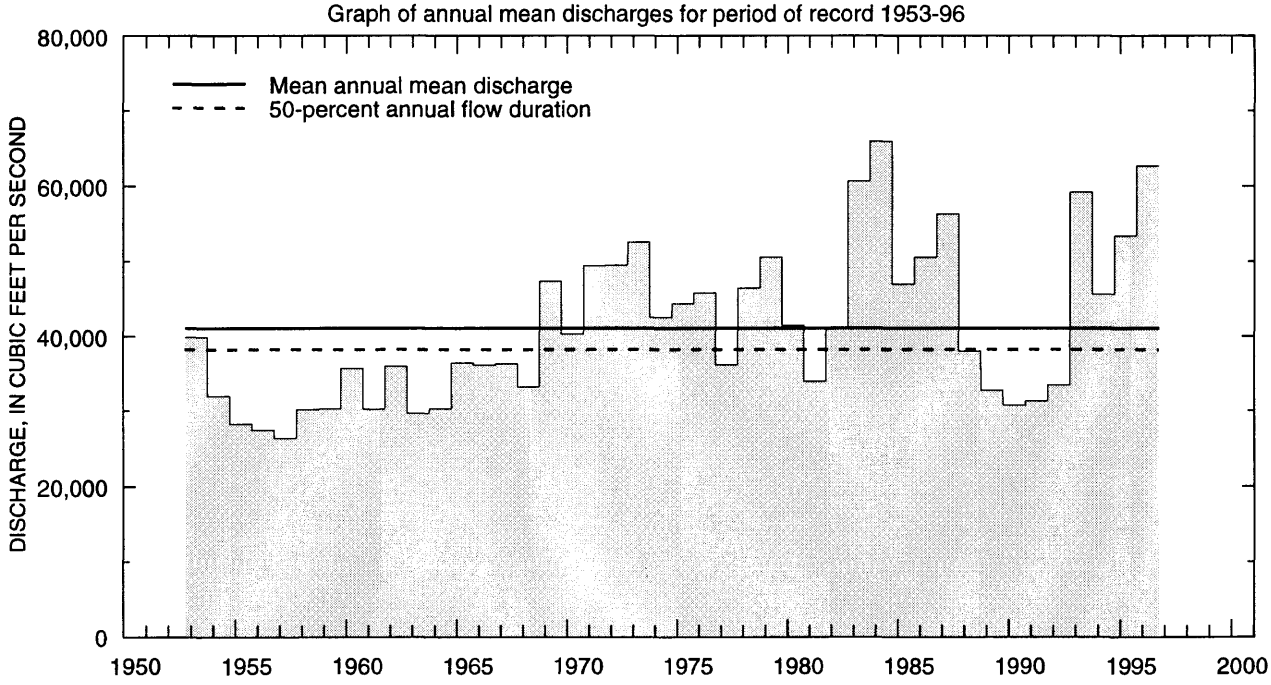
06813500 MISSOURI RIVER AT RULO, NEBRASKA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1953-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	77,770	1987	25,580	1962	43,470	11,290
November	69,590	1996	17,000	1962	38,680	15,580
December	55,240	1987	9,953	1956	25,630	11,050
January	42,280	1973	10,800	1957	21,610	8,209
February	52,560	1983	13,230	1957	27,420	10,020
March	79,590	1979	15,380	1957	40,660	15,440
April	102,900	1984	21,820	1957	49,790	17,090
May	94,370	1984	33,790	1956	50,440	14,770
June	130,600	1984	33,710	1956	55,510	19,040
July	164,800	1993	33,860	1963	50,060	21,320
August	78,730	1996	29,820	1955	44,370	10,680
September	69,780	1975	34,140	1991	44,720	10,460
Annual	65,930	1984	26,340	1957	41,070	10,390

Graph of annual mean discharges for period of record 1953-96



06813500 MISSOURI RIVER AT RULO, NEBRASKA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1953-96

Percentage of days discharge equaled or exceeded	Discharge [K = 1,000] (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	18,400	12,500	6,000	6,940	9,720	13,300	17,500	31,400	31,300	31,700	30,200	31,700	10,000
95	32,400	15,900	10,000	10,000	12,900	16,100	31,700	33,200	34,400	33,200	32,400	33,200	15,000
90	33,300	17,200	13,000	11,700	14,300	19,700	32,900	34,400	35,700	34,100	33,500	33,900	18,000
85	33,800	18,700	14,700	13,000	15,500	21,700	34,400	35,600	36,800	35,100	34,500	34,500	22,200
80	34,300	21,500	15,500	14,000	16,700	23,300	35,700	36,500	37,500	36,100	35,300	35,000	25,900
75	35,000	24,300	16,300	15,000	18,000	25,400	36,800	37,300	38,600	36,900	36,000	35,600	30,600
70	35,600	29,100	17,000	15,600	20,000	27,700	38,000	38,200	40,500	37,600	36,800	36,600	33,100
60	38,200	35,300	20,600	18,300	22,800	32,800	40,700	41,000	44,300	39,600	38,400	38,300	35,600
50	40,100	38,600	23,800	20,200	25,000	37,700	44,200	44,700	49,000	42,500	40,200	40,100	38,200
40	41,700	40,900	26,100	22,600	27,800	40,700	47,900	49,000	53,100	46,400	42,400	42,900	41,100
30	45,600	44,700	30,300	25,000	30,000	45,300	51,800	54,000	59,000	52,600	47,400	47,900	45,900
25	49,800	49,100	32,100	26,600	32,600	47,900	54,700	57,800	63,100	56,200	50,400	50,500	49,300
20	52,600	51,800	34,100	28,700	35,800	50,800	58,900	62,900	67,500	59,600	53,600	54,400	52,700
15	56,200	59,500	37,700	30,900	38,000	58,200	64,000	67,000	75,200	64,400	57,400	57,600	58,000
10	60,600	63,500	41,300	33,100	42,000	67,900	75,800	75,300	84,500	70,300	60,500	64,300	64,500
5	67,800	67,000	50,400	38,000	52,600	81,400	93,900	90,000	103K	84,400	67,600	70,000	74,300

Magnitude and frequency of instantaneous peak discharges[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	--
0.90	1.11	--
0.80	1.25	--
0.50	2	117,000
0.20	5	--
0.10	10	170,000
0.04	25	--
0.02	50	220,000
0.01	100	241,000
0.005	200	--
0.002	500	290,000

Magnitude and frequency of annual high discharges, based on period of record 1953-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	42,300	37,600	33,800	33,200
0.95	1.05	51,700	45,600	40,600	38,800
0.90	1.11	58,000	50,900	45,300	42,600
0.80	1.25	67,100	58,900	52,200	48,100
0.50	2	91,000	80,000	70,400	62,600
0.20	5	127,000	113,000	99,300	84,900
0.10	10	154,000	138,000	121,000	101,000
0.04	25	190,000	173,000	151,000	124,000
0.02	50	219,000	201,000	176,000	143,000
0.01	100	249,000	232,000	203,000	162,000
0.005	200	282,000	265,000	232,000	184,000

[a] *Final Report, Missouri River Flood Plain Study,* Missouri Basin States Association, May 1983. These values are subject to change pending an on-going interagency review of frequency relationships of the entire Upper Mississippi River system by the Upper Mississippi, Lower Missouri, and Illinois Rivers Flow-Frequency Study Task Force.

06813500 MISSOURI RIVER AT RULO, NEBRASKA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1953 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3,330	3,590	4,190	6,000	7,820	8,720	9,260	10,300	15,000
0.02	50	3,840	4,160	4,870	6,760	8,640	9,630	10,300	11,400	16,200
0.05	20	4,770	5,180	6,100	8,090	10,000	11,200	12,000	13,400	18,300
0.10	10	5,800	6,300	7,430	9,480	11,500	12,800	13,800	15,400	20,500
0.20	5	7,370	8,000	9,400	11,500	13,500	15,000	16,300	18,200	23,400
0.50	2	11,800	12,700	14,600	16,600	18,600	20,400	22,300	25,000	30,400
0.80	1.25	19,100	20,200	22,400	23,900	25,800	27,900	30,700	34,100	39,800
0.90	1.11	24,700	25,900	27,800	28,900	30,700	32,800	36,200	40,000	45,900
0.96	1.04	32,600	33,700	35,000	35,400	36,900	39,100	43,200	47,400	53,600
0.98	1.02	39,200	40,000	40,400	40,400	41,700	43,800	48,400	52,800	59,300
0.99	1.01	45,400	45,400	45,400	45,400	46,500	48,500	53,600	58,200	65,000

Magnitude and frequency of seasonal low discharges, based on period of record October 1952 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3,830	5,030	7,000	8,660	18,200	19,700	20,700	25,600
0.02	50	4,440	5,780	7,770	9,470	20,100	21,700	22,600	27,000
0.05	20	5,530	7,100	9,100	10,900	23,300	24,800	25,800	29,300
0.10	10	6,710	8,510	10,500	12,300	26,300	27,900	28,800	31,600
0.20	5	8,460	10,500	12,500	14,300	30,200	31,700	32,600	34,700
0.50	2	13,200	15,700	17,400	19,400	38,200	39,700	40,700	42,100
0.80	1.25	20,300	23,200	24,400	26,600	46,400	48,100	49,600	51,700
0.90	1.11	25,500	28,200	29,200	31,600	50,600	52,600	54,400	58,000
0.96	1.04	32,300	34,700	35,300	38,100	55,000	57,300	59,700	65,800
0.98	1.02	37,700	39,600	40,100	43,000	57,800	60,300	63,100	71,500
0.99	1.01	43,200	44,500	44,900	48,100	60,100	62,900	66,200	77,200
		July-August-September				October-November-December			
0.01	100	15,600	20,200	26,300	29,000	3,230	4,450	6,370	8,090
0.02	50	18,100	22,100	27,300	29,700	4,020	5,390	7,400	9,170
0.05	20	22,200	25,000	28,900	31,000	5,490	7,110	9,200	11,100
0.10	10	26,000	27,900	30,600	32,400	7,150	8,980	11,100	13,000
0.20	5	30,600	31,500	32,900	34,400	9,690	11,800	13,800	15,900
0.50	2	38,500	38,600	38,700	39,800	16,600	18,900	20,600	23,100
0.80	1.25	45,800	46,500	46,600	48,000	26,700	28,800	29,900	33,400
0.90	1.11	48,300	50,600	51,900	53,800	33,500	35,100	35,900	40,400
0.96	1.04	50,300	54,900	58,700	61,700	42,000	42,800	43,300	49,400
0.98	1.02	51,200	57,700	63,900	67,900	48,100	48,300	48,600	56,200
0.99	1.01	51,800	60,100	69,100	74,400	53,400	53,500	53,800	63,000

06817000 NODAWAY RIVER AT CLARINDA, IOWA

LOCATION.—Lat 40°44'19", long 95°00'47", in SW1/4 NE1/4 sec. 32, T69N, R36W, Page County, Hydrologic Unit 10240009, near left abutment of downstream side of bridge on State Highway 2 (city route); 0.5 mi downstream from North Branch, 1.2 mi east of city square of Clarinda, and 7.5 mi upstream from East Nodaway River.

DRAINAGE AREA.—762 mi^2.

PERIOD OF RECORD.—April 1919 to July 1925 (no winter record), May 1936 to September 1996. Monthly discharge only for some periods, published in WSP 1310.

GAGE.—Water-stage recorder. Datum of gage is 955.36 ft above sea level. Prior to July 5, 1925, and May 28, 1936, to March 26, 1957 nonrecording gage at same site, and prior to October 1, 1987, at datum 5.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 31,100 ft^3/s, June 13, 1947, gage height, 25.3 ft, from flood mark and rating curve extended above 15,000 ft^3/s on basis of an overflow profile and extended channel rating; minimum daily discharge, 1.0 ft^3/s, September 5, 9, 12, 14, 1918, December 9, 27–31, 1923.

Selected values from rating table number 27, developed October 1994

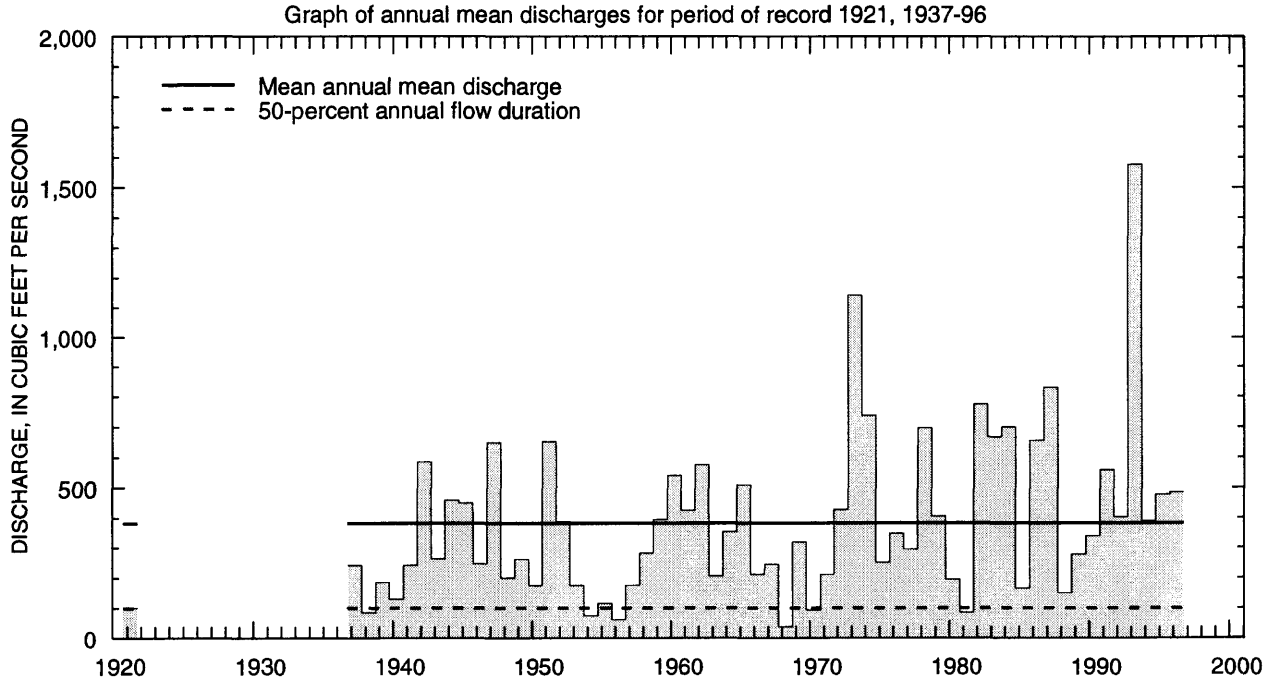
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.0	11.1	12.0	5,240
6.0	108	15.0	11,800
7.0	413	18.0	17,300
8.0	1,050	21.0	23,600
10.0	2,350	23.8	30,000

06817000 NODAWAY RIVER AT CLARINDA, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1921, 1937-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,658	1974	7.52	1938	184	320
November	1,602	1973	8.27	1938	177	286
December	1,090	1993	9.97	1940	142	222
January	853	1974	6.52	1940	134	187
February	1,857	1973	11.3	1940	310	316
March	2,456	1979	14.0	1938	595	546
April	2,450	1973	14.4	1956	545	572
May	2,489	1996	10.3	1939	705	704
June	4,779	1947	20.0	1968	758	813
July	6,778	1993	17.3	1954	461	890
August	1,953	1987	13.3	1955	248	350
September	3,019	1972	6.83	1937	338	585
Annual	1,577	1993	36.8	1968	383	275

Graph of annual mean discharges for period of record 1921, 1937-96



06817000 NODAWAY RIVER AT CLARINDA, IOWA—Continued

Monthly and annual flow durations, based on period of record 1921, 1937-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	7.0	8.0	6.0	6.0	9.0	14	12	10	11	10	10	6.0	8.0
95	11	12	11	8.0	13	31	22	21	20	14	17	11	13
90	15	20	15	12	18	42	36	32	29	20	21	17	20
85	20	28	18	15	25	53	54	43	42	31	27	21	27
80	24	32	21	17	32	67	72	58	62	46	36	26	34
75	30	36	27	22	40	85	90	78	97	63	41	32	40
70	33	40	32	29	46	104	108	106	128	77	50	37	48
60	40	51	41	39	65	165	145	184	185	113	65	46	68
50	51	65	55	50	100	220	214	269	262	153	84	58	100
40	76	80	66	68	140	310	318	394	383	208	109	77	153
30	117	110	90	100	205	460	489	625	579	292	144	138	240
25	150	136	110	120	260	560	586	763	699	341	170	177	306
20	200	190	150	160	350	692	733	949	930	411	216	244	404
15	258	258	252	223	482	941	928	1,250	1,180	526	273	376	560
10	385	374	349	300	700	1,320	1,310	1,690	1,620	780	416	571	834
5	710	710	558	450	1,340	2,360	2,090	2,880	3,140	1,760	824	1,160	1,520

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 69 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,860
0.90	1.11	4,040
0.80	1.25	5,970
0.50	2	11,500
0.20	5	20,000
0.10	10	25,500
0.04	25	32,200
0.02	50	36,900
0.01	100	41,300
0.005	200	45,400

Magnitude and frequency of annual high discharges, based on period of record 1921, 1937-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	333	221	150	114
0.95	1.05	964	592	399	285
0.90	1.11	1,570	935	626	437
0.80	1.25	2,630	1,530	1,020	697
0.50	2	5,770	3,290	2,150	1,460
0.20	5	9,890	5,720	3,680	2,550
0.10	10	12,100	7,090	4,520	3,190
0.04	25	14,100	8,490	5,360	3,880
0.02	50	15,200	9,310	5,840	4,300
0.01	100	16,100	9,970	6,230	4,660
0.005	200	16,700	10,500	6,540	4,960

06817000 NODAWAY RIVER AT CLARINDA, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1920 to March 1921, April 1937 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	3.2	3.7	4.0	4.4	5.7	7.4	8.0	8.6	10
0.02	50	3.8	4.3	4.7	5.3	6.7	8.6	9.6	10	13
0.05	20	5.0	5.7	6.2	6.9	8.6	11	13	14	18
0.10	10	6.6	7.4	8.0	8.8	11	14	17	19	25
0.20	5	9.2	10	11	12	15	19	23	27	37
0.50	2	19	20	22	24	29	37	48	56	84
0.80	1.25	40	43	46	52	61	84	106	125	203
0.90	1.11	62	65	71	80	93	134	167	196	329
0.96	1.04	100	105	114	131	150	230	278	324	564
0.98	1.02	137	145	158	182	207	334	393	454	807
0.99	1.01	185	195	213	247	281	474	542	621	1,120

Magnitude and frequency of seasonal low discharges, based on period of record July 1919 to June 1925 (no winter record), June 1936 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	3.2	3.2	3.3	4.6	3.2	4.5	6.7	8.3
0.02	50	4.2	4.2	4.4	6.0	4.6	6.3	9.1	12
0.05	20	6.0	6.2	6.6	8.9	7.7	10	14	19
0.10	10	8.4	8.9	9.6	13	12	16	22	29
0.20	5	13	14	15	21	21	27	36	50
0.50	2	30	34	38	52	60	74	95	142
0.80	1.25	75	85	99	141	163	197	252	402
0.90	1.11	124	142	165	243	273	326	422	694
0.96	1.04	216	247	290	442	467	553	731	1,250
0.98	1.02	313	356	420	658	659	775	1,040	1,820
0.99	1.01	442	497	588	948	894	1,050	1,440	2,570
		July-August-September				October-November-December			
0.01	100	2.8	4.8	5.4	6.3	2.1	2.5	3.3	4.1
0.02	50	3.6	5.9	6.6	7.9	2.7	3.3	4.3	5.3
0.05	20	5.3	7.9	9.0	11	4.2	5.1	6.3	7.8
0.10	10	7.5	11	12	15	6.1	7.4	9.0	11
0.20	5	11	15	17	23	9.8	12	14	17
0.50	2	26	31	36	52	24	30	34	42
0.80	1.25	59	69	81	123	62	76	86	108
0.90	1.11	91	107	126	198	102	125	143	180
0.96	1.04	146	174	207	337	173	214	249	314
0.98	1.02	198	240	288	479	245	305	359	455
0.99	1.01	262	324	390	662	336	420	502	639

06818750 PLATTE RIVER NEAR DIAGONAL, IOWA

LOCATION.—Lat 40°46'09", long 94°24'18", in NE1/4 NW1/4 sec. 22, T69N, R31W, Ringgold County, Hydrologic Unit 10240012, on left bank at downstream side of bridge of county highway, 2.2 mi upstream from Turkey Creek, 4.6 mi southwest of Diagonal and 4.9 mi downstream from Gard Creek.

DRAINAGE AREA.—217 mi^2.

PERIOD OF RECORD.—April 1968 to September 1991 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1,095.27 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 8,630 ft^3/s, September 9, 1989, gage height, 23.60 ft; minimum daily discharge, 0.21 ft^3/s, January 14–15, 1969.

Selected values from rating table number 8, developed October 1987

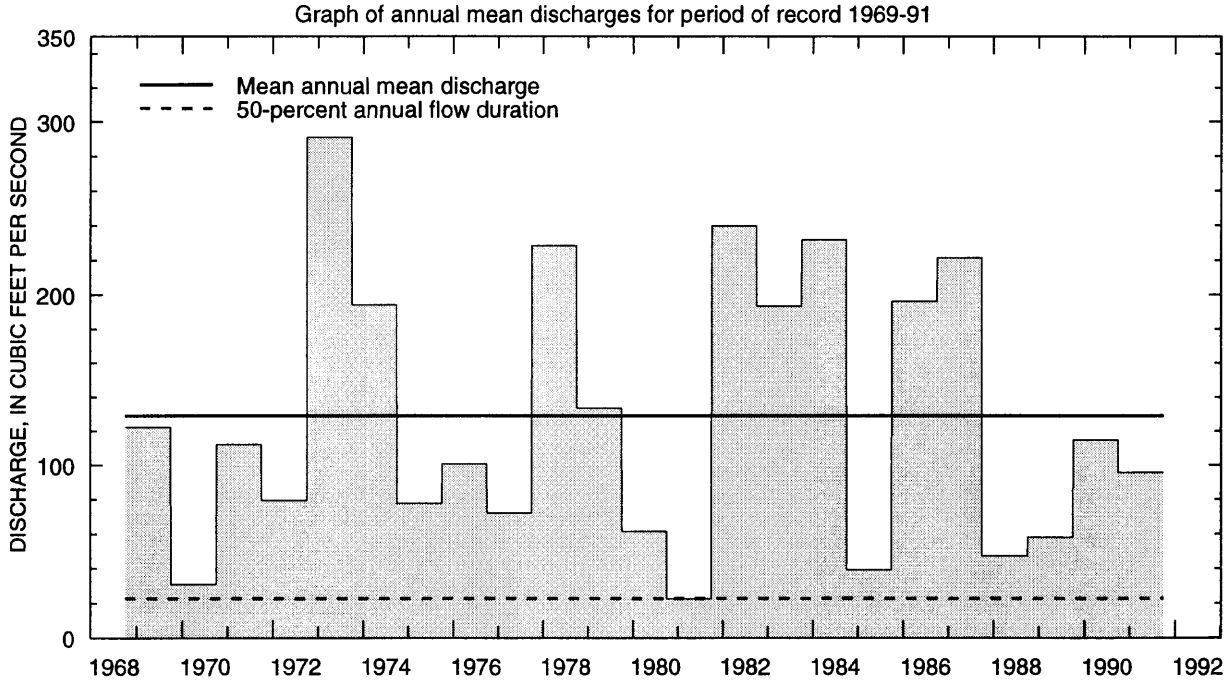
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	6.34	12.0	1,760
5.0	80.9	15.0	2,810
6.0	216	18.0	3,970
7.0	408	21.0	5,310
9.0	900	23.0	7,200

06818750 PLATTE RIVER NEAR DIAGONAL, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1969-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	680	1978	1.98	1989	91.9	177
November	404	1973	4.31	1977	84.2	104
December	276	1983	2.27	1989	60.8	85.9
January	298	1974	0.81	1977	44.2	72.9
February	577	1973	0.74	1978	127	158
March	688	1979	10.8	1981	196	192
April	682	1973	3.41	1989	236	228
May	1,001	1982	4.09	1977	235	243
June	656	1984	3.58	1977	169	164
July	516	1969	3.15	1977	119	161
August	728	1987	2.83	1988	65.0	151
September	614	1989	2.54	1971	122	206
Annual	291	1973	22.7	1981	129	78.7

Graph of annual mean discharges for period of record 1969-91



06818750 PLATTE RIVER NEAR DIAGONAL, IOWA—Continued

Monthly and annual flow durations, based on period of record 1969-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	1.5	2.5	1.1	0.28	0.30	4.4	2.7	2.1	1.8	1.2	0.65	1.4	0.80
95	1.8	3.0	2.0	0.74	1.5	8.0	6.0	5.0	3.0	1.8	1.7	1.8	2.2
90	2.2	3.4	3.0	1.6	3.0	13	11	11	4.4	2.7	2.4	2.4	3.2
85	2.6	4.8	4.0	3.2	4.0	18	17	15	6.8	3.2	3.3	3.0	4.0
80	3.1	6.2	5.0	4.0	5.0	24	22	18	10	3.9	4.3	3.3	5.2
75	3.4	7.8	6.4	4.5	6.3	28	28	23	14	5.1	5.1	3.7	6.7
70	3.9	9.5	7.4	5.4	8.6	34	35	28	18	7.1	5.5	4.2	8.9
60	6.1	13	10	9.0	11	48	51	45	29	13	6.7	5.0	14
50	9.2	19	15	11	20	70	72	67	44	18	8.9	7.0	23
40	13	33	27	17	34	102	100	98	65	31	12	11	38
30	23	53	45	30	60	141	145	151	91	50	18	21	65
25	43	73	58	38	90	174	177	182	109	62	22	37	84
20	65	91	74	46	107	229	230	240	134	77	27	54	107
15	94	119	99	62	160	306	336	334	171	108	34	93	150
10	138	216	122	85	292	452	495	550	290	175	53	147	244
5	339	364	201	146	540	813	950	1,020	800	413	139	396	510

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 25 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	2,410
0.90	1.11	2,880
0.80	1.25	3,530
0.50	2	4,990
0.20	5	6,700
0.10	10	7,660
0.04	25	8,720
0.02	50	9,410
0.01	100	10,000
0.005	200	10,600

Magnitude and frequency of annual high discharges, based on period of record 1969-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	302	175	101	64
0.95	1.05	615	372	234	146
0.90	1.11	862	527	340	213
0.80	1.25	1,250	765	500	317
0.50	2	2,270	1,360	873	567
0.20	5	3,590	2,050	1,230	829
0.10	10	4,360	2,400	1,380	945
0.04	25	5,170	2,740	1,500	1,040
0.02	50	5,670	2,930	1,550	1,090
0.01	100	6,110	3,070	1,580	1,120
0.005	200	6,480	3,190	1,610	1,150

06818750 PLATTE RIVER NEAR DIAGONAL, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1968 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.16	0.16	0.16	0.20	0.35	0.86	1.4	1.5	1.5
0.02	50	0.22	0.22	0.22	0.28	0.46	1.0	1.6	1.8	2.1
0.05	20	0.33	0.34	0.36	0.44	0.69	1.4	2.2	2.5	3.4
0.10	10	0.47	0.51	0.55	0.66	1.0	1.9	3.0	3.5	5.2
0.20	5	0.73	0.82	0.91	1.1	1.6	2.9	4.5	5.3	8.8
0.50	2	1.8	2.0	2.3	2.7	3.8	7.0	10	13	25
0.80	1.25	4.4	4.9	5.6	6.8	9.6	20	27	34	72
0.90	1.11	7.2	7.8	8.8	11	16	37	47	61	126
0.96	1.04	12	13	14	18	26	75	90	115	231
0.98	1.02	17	17	19	25	37	122	139	179	342
0.99	1.01	24	24	24	34	51	192	209	269	489

Magnitude and frequency of seasonal low discharges, based on period of record April 1968 to September 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.10	0.11	0.12	0.25	0.63	0.84	1.0	1.8
0.02	50	0.16	0.19	0.21	0.41	0.90	1.2	1.5	2.6
0.05	20	0.36	0.41	0.48	0.83	1.5	2.1	2.5	4.4
0.10	10	0.70	0.80	0.94	1.5	2.4	3.2	4.0	7.2
0.20	5	1.5	1.7	2.0	3.2	4.0	5.5	7.1	13
0.50	2	5.8	6.7	8.1	12	11	14	20	38
0.80	1.25	20	22	28	43	26	34	54	111
0.90	1.11	35	40	50	80	42	52	90	192
0.96	1.04	62	70	89	152	66	80	152	343
0.98	1.02	89	100	126	228	89	105	213	497
0.99	1.01	120	135	171	326	115	133	286	692
		July-August-September				October-November-December			
0.01	100	0.50	0.55	0.73	1.6	0.44	0.61	0.69	1.0
0.02	50	0.59	0.66	0.85	1.7	0.53	0.73	0.86	1.3
0.05	20	0.76	0.87	1.1	1.9	0.72	0.98	1.2	1.8
0.10	10	0.97	1.1	1.4	2.1	0.97	1.3	1.8	2.5
0.20	5	1.3	1.5	1.8	2.7	1.5	2.0	2.7	3.9
0.50	2	2.5	2.9	3.5	4.9	3.7	4.8	7.0	9.8
0.80	1.25	5.0	5.9	7.4	12	11	14	20	28
0.90	1.11	7.5	8.7	11	22	21	26	38	52
0.96	1.04	12	13	18	47	45	54	75	102
0.98	1.02	16	18	26	82	76	90	120	163
0.99	1.01	21	23	35	139	124	144	185	251

06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IOWA

LOCATION.—Lat 40°39'38", long 94°42'59", in NE1/4 sec. 35, T68N, R34W, Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of County Highway N44, 0.1 mi south of Bedford, 0.4 mi upstream from concrete stabilization dam, and 3.0 mi upstream from Daugherty Creek.

DRAINAGE AREA.—85.4 mi^2.

PERIOD OF RECORD.—October 1983 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 1,069.16 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 9,570 ft^3/s, July 14, 1986, gage height 23.47 ft; maximum gage height, 23.85 ft, July 5, 1993; no flow many days between July 6 and December 24, 1989.

Selected values from rating table number 4, developed October 1990

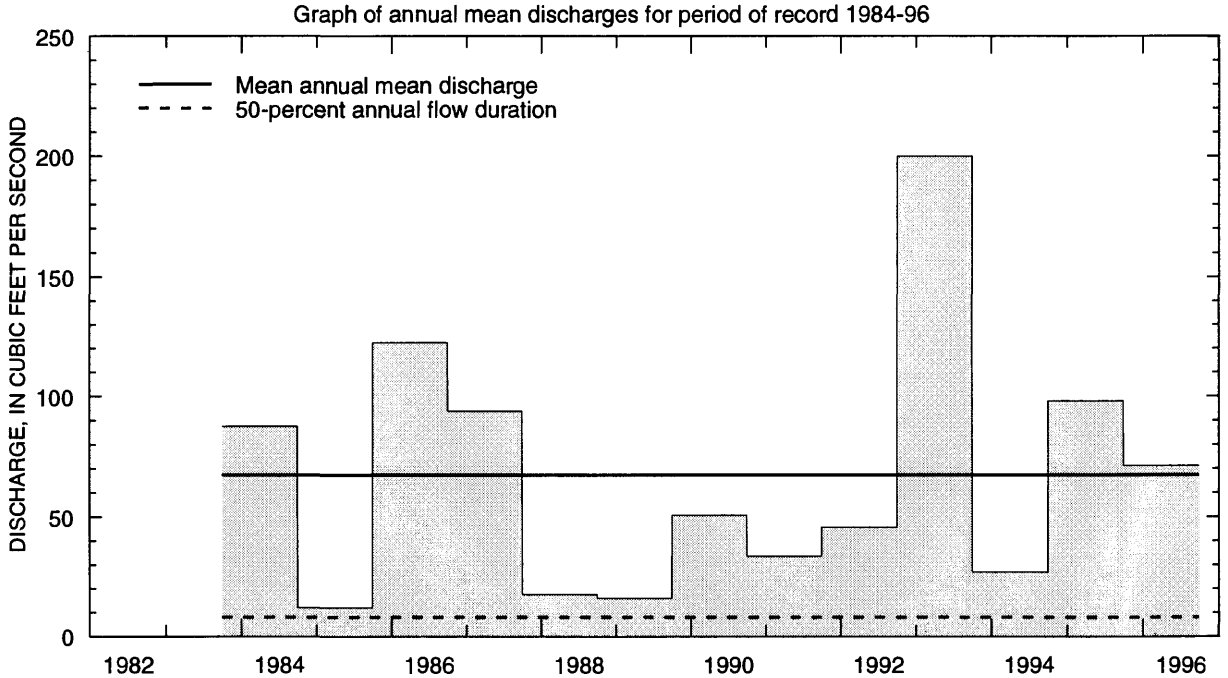
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
11.0	37.5	15.0	1,320
11.5	111	17.0	2,580
12.0	207	19.0	4,270
13.0	475	21.0	6,380
14.0	844	23.0	8,910

06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1984-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	159	1987	0.26	1992	29.1	56.0
November	202	1993	0.78	1991	30.8	55.8
December	181	1993	0.47	1989	30.7	52.9
January	21.1	1988	0.50	1991	9.96	7.40
February	75.1	1996	0.17	1989	34.0	23.7
March	218	1993	2.13	1989	68.0	65.0
April	289	1984	0.82	1989	94.0	96.1
May	488	1995	0.67	1989	165	173
June	255	1995	1.90	1988	104	89.8
July	889	1993	1.97	1988	146	253
August	173	1987	0.63	1991	26.0	48.6
September	260	1993	0.31	1991	67.3	100
Annual	200	1993	12.0	1985	67.3	53.5

Graph of annual mean discharges for period of record 1984-96



06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1984-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.06	0.22	0.01	0.14	0.04	0.38	0.22	0.22	0.22	0.00	0.00	0.11	0.06
95	0.12	0.50	0.22	0.38	0.17	1.2	1.2	0.71	0.76	0.23	0.22	0.22	0.28
90	0.22	0.75	0.51	0.65	0.70	3.2	2.0	1.3	1.2	0.83	0.49	0.27	0.64
85	0.38	0.79	0.79	0.75	1.2	4.4	4.7	4.2	1.4	1.2	0.68	0.39	0.86
80	0.40	0.92	0.99	0.80	3.1	6.2	6.0	5.8	2.8	1.7	0.89	0.64	1.2
75	0.55	1.0	1.2	0.90	3.9	8.0	7.0	8.6	5.1	2.3	1.1	0.67	1.3
70	0.66	1.2	1.4	1.5	4.5	8.9	8.6	12	7.6	3.1	1.2	1.0	2.1
60	0.93	2.2	2.5	4.0	6.0	13	15	20	13	5.3	1.5	1.2	4.8
50	1.3	4.3	5.0	6.6	10	19	26	33	24	8.0	2.1	1.7	8.0
40	3.2	8.7	7.2	8.4	14	32	37	53	34	14	3.5	4.2	14
30	11	15	14	11	23	46	51	87	52	28	5.9	7.2	26
25	14	19	23	13	30	55	61	115	68	39	7.7	9.5	34
20	22	26	34	15	37	70	78	161	88	63	11	20	45
15	35	34	43	18	51	90	111	249	135	120	17	50	66
10	47	53	68	25	80	135	189	393	220	231	31	74	106
5	91	111	117	37	183	297	461	921	523	823	74	284	270

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 37 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,300
0.90	1.11	1,730
0.80	1.25	2,390
0.50	2	4,170
0.20	5	6,710
0.10	10	8,360
0.04	25	10,300
0.02	50	11,700
0.01	100	13,000
0.005	200	14,300

[a] Analysis includes area-weighted peak discharges (1960-83) computed from station 06819190 East Fork 102 River near Bedford.

Magnitude and frequency of annual high discharges, based on period of record 1984-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	88	62	52	31
0.95	1.05	221	138	99	61
0.90	1.11	339	204	137	86
0.80	1.25	542	315	200	128
0.50	2	1,140	652	389	260
0.20	5	1,990	1,190	708	496
0.10	10	2,490	1,550	944	679
0.04	25	3,030	1,980	1,260	933
0.02	50	3,360	2,290	1,500	1,130
0.01	100	3,640	2,570	1,750	1,340
0.005	200	3,880	2,830	2,000	1,560

06819185 EAST FORK ONE HUNDRED AND TWO RIVER AT BEDFORD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1984 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.04	0.08	0.09	0.10	0.16
0.02	50	0.00	0.00	0.00	0.00	0.05	0.11	0.13	0.15	0.25
0.05	20	0.00	0.00	0.00	0.00	0.09	0.19	0.23	0.27	0.50
0.10	10	0.00	0.02	0.04	0.04	0.15	0.30	0.39	0.46	0.90
0.20	5	0.06	0.10	0.15	0.17	0.28	0.53	0.75	0.89	1.8
0.50	2	0.54	0.55	0.60	0.70	0.93	1.7	2.7	3.4	7.0
0.80	1.25	1.7	1.7	1.8	2.3	3.2	5.8	10	14	26
0.90	1.11	2.7	2.8	3.1	4.2	6.3	12	22	31	52
0.96	1.04	3.8	4.3	5.2	7.7	13	24	49	74	107
0.98	1.02	4.5	5.6	7.2	11	21	40	84	132	169
0.99	1.01	5.0	6.8	9.6	16	32	64	136	223	255

Magnitude and frequency of seasonal low discharges, based on period of record October 1983 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.04	0.04	0.04	0.04	0.08	0.09	0.09
0.02	50	0.01	0.07	0.07	0.09	0.07	0.15	0.18	0.18
0.05	20	0.04	0.16	0.19	0.25	0.17	0.35	0.46	0.53
0.10	10	0.13	0.32	0.42	0.59	0.36	0.71	0.99	1.3
0.20	5	0.41	0.67	0.96	1.4	0.83	1.5	2.3	3.5
0.50	2	1.9	2.2	3.4	5.5	3.3	5.6	9.2	19
0.80	1.25	4.3	5.4	8.3	14	10	15	28	78
0.90	1.11	5.2	7.9	12	19	17	24	45	147
0.96	1.04	5.8	11	15	25	27	36	69	266
0.98	1.02	6.0	13	17	28	35	45	88	375
0.99	1.01	6.1	15	19	31	44	54	108	498
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.08	0.00	0.01	0.03	0.09
0.02	50	0.00	0.00	0.00	0.10	0.00	0.02	0.05	0.12
0.05	20	0.00	0.00	0.00	0.16	0.00	0.05	0.09	0.18
0.10	10	0.03	0.09	0.12	0.26	0.01	0.10	0.16	0.29
0.20	5	0.13	0.23	0.28	0.47	0.07	0.22	0.32	0.52
0.50	2	0.70	0.81	0.99	1.7	0.88	1.0	1.3	1.9
0.80	1.25	2.4	2.6	3.5	7.2	5.0	5.2	6.0	8.7
0.90	1.11	4.2	4.9	7.1	17	11	12	14	21
0.96	1.04	7.2	9.6	15	44	21	31	36	60
0.98	1.02	9.9	15	26	84	32	56	67	121
0.99	1.01	13	23	43	155	45	96	120	236

06819190 EAST FORK ONE HUNDRED AND TWO RIVER NEAR BEDFORD, IOWA

LOCATION.—Lat 40°38'01", long 94°44'54", in NE1/4 NE1/4 sec. 9, T67N, R34W, Taylor County, Hydrologic Unit 10240013, on left bank at downstream side of bridge of County Highway J55, 1.0 mi upstream from Daughtery Creek and 2.8 mi southwest of junction of U.S. Highways 2 and 148 in Bedford.

DRAINAGE AREA.—92.1 mi^2.

PERIOD OF RECORD.—September 1959 to September 1983 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 1.057.51 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to October 1, 1968, at datum 5.0 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 9,980 ft^3/s, October 11, 1973, gage height, 20.72 ft; maximum gage height, 20.95 ft, January 12, 1960; no flow numerous times during period of record.

Selected values from rating table number 25, developed April 1980
(A discharge measurement to validate this rating has not been made since October 1983)

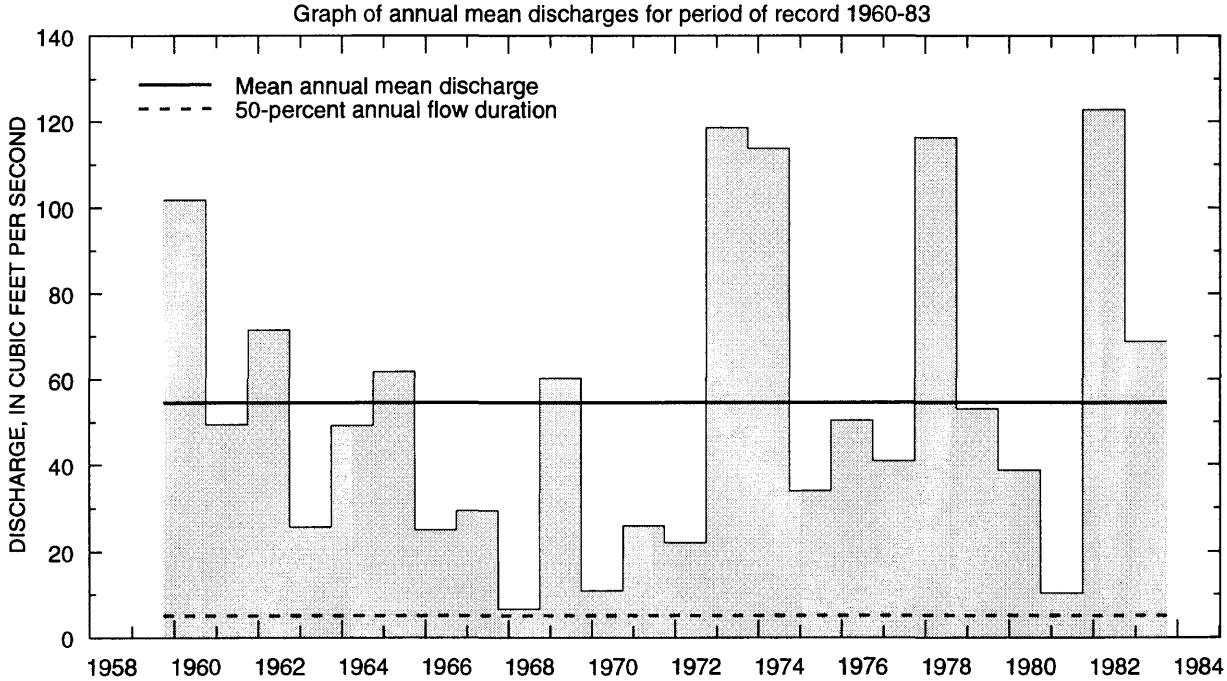
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
9.5	112	14.0	2,850
10.0	209	15.0	4,850
11.0	379	16.0	6,890
12.0	530	18.0	11,600
13.0	1,160		

06819190 EAST FORK ONE HUNDRED AND TWO RIVER NEAR BEDFORD, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1960-83

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	419	1974	0.24	1976	45.5	116
November	172	1962	0.22	1964	29.5	47.9
December	138	1983	0.095	1977	20.5	35.9
January	291	1960	0.009	1977	30.9	69.5
February	296	1973	0.49	1978	54.1	77.1
March	384	1973	0.66	1968	104	111
April	370	1976	6.40	1977	84.2	93.6
May	484	1982	1.53	1977	82.6	105
June	327	1967	1.17	1977	93.0	99.5
July	153	1969	0.16	1977	32.9	46.1
August	239	1977	0.41	1967	33.9	71.1
September	234	1977	0.40	1968	43.6	64.2
Annual	123	1982	6.62	1968	54.5	36.2

Graph of annual mean discharges for period of record 1960-83



06819190 EAST FORK ONE HUNDRED AND TWO RIVER NEAR BEDFORD, IOWA—Continued

Monthly and annual flow durations, based on period of record 1960-83

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.02	0.10	0.00	0.00	0.00	0.18	0.27	0.36	0.20	0.02	0.01	0.07	0.01
95	0.10	0.20	0.08	0.00	0.11	0.66	1.6	0.96	0.32	0.10	0.12	0.20	0.20
90	0.20	0.29	0.20	0.11	0.31	1.5	2.9	2.1	0.97	0.30	0.20	0.26	0.31
85	0.30	0.38	0.30	0.30	0.58	2.7	4.1	3.7	1.5	0.46	0.31	0.34	0.50
80	0.40	0.50	0.65	0.40	1.0	4.0	5.9	4.6	2.0	0.64	0.40	0.40	0.71
75	0.47	0.82	1.3	0.60	1.5	6.0	7.9	5.5	2.5	0.90	0.46	0.50	1.1
70	0.60	1.2	1.8	1.2	2.0	9.0	10	7.6	3.3	1.1	0.55	0.60	1.6
60	0.90	2.5	2.5	2.0	3.9	13	15	11	5.5	1.5	0.80	0.82	3.0
50	2.2	4.0	4.0	3.0	5.8	20	21	15	7.9	2.3	1.1	1.4	5.0
40	3.8	6.6	6.0	4.1	10	30	28	23	12	3.8	1.4	2.8	8.9
30	7.2	11	9.0	8.0	20	50	39	33	22	7.0	2.4	4.8	16
25	8.9	14	10	10	30	70	47	41	29	9.3	3.3	9.0	22
20	13	24	15	20	40	93	65	57	42	12	5.3	15	30
15	18	36	20	24	57	142	95	90	69	19	9.9	21	44
10	28	57	36	33	100	213	159	155	164	35	20	46	78
5	73	107	62	78	213	500	371	386	396	105	60	174	205

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 37 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	1,370
0.90	1.11	1,820
0.80	1.25	2,510
0.50	2	4,360
0.20	5	7,020
0.10	10	8,740
0.04	25	10,800
0.02	50	12,200
0.01	100	13,600
0.005	200	14,900

[a] Analysis includes area-weighted peak discharges (1984-96) computed from station 06819185 East Fork 102 River at Bedford.

Magnitude and frequency of annual high discharges, based on period of record 1960-83

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	119	63	38	20
0.95	1.05	273	149	91	53
0.90	1.11	404	222	137	82
0.80	1.25	617	341	212	130
0.50	2	1,210	669	411	260
0.20	5	2,000	1,090	653	412
0.10	10	2,450	1,330	777	485
0.04	25	2,930	1,560	894	550
0.02	50	3,210	1,700	958	583
0.01	100	3,450	1,820	1,010	607
0.005	200	3,650	1,910	1,040	624

06819190 EAST FORK ONE HUNDRED AND TWO RIVER NEAR BEDFORD, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1960 to March 1983

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.08	0.11
0.02	50	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.12	0.19
0.05	20	0.00	0.00	0.00	0.00	0.00	0.08	0.14	0.22	0.41
0.10	10	0.00	0.00	0.00	0.00	0.07	0.15	0.26	0.39	0.79
0.20	5	0.00	0.00	0.02	0.04	0.17	0.32	0.51	0.76	1.7
0.50	2	0.14	0.18	0.24	0.28	0.50	1.2	1.9	2.7	7.2
0.80	1.25	0.52	0.59	0.71	0.88	1.4	4.7	7.0	9.9	28
0.90	1.11	0.84	0.93	1.1	1.4	2.6	9.3	14	19	54
0.96	1.04	1.3	1.4	1.5	2.1	5.0	19	28	40	108
0.98	1.02	1.6	1.7	1.8	2.7	7.8	30	44	63	166
0.99	1.01	1.9	2.0	2.1	3.3	12	46	66	95	242

Magnitude and frequency of seasonal low discharges, based on period of record October 1959 to September 1983

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.02	0.10	0.22	0.36
0.02	50	0.00	0.00	0.00	0.00	0.03	0.15	0.31	0.57
0.05	20	0.00	0.00	0.00	0.04	0.08	0.25	0.51	1.1
0.10	10	0.00	0.00	0.00	0.19	0.16	0.41	0.80	1.9
0.20	5	0.11	0.17	0.20	0.55	0.36	0.74	1.4	3.6
0.50	2	1.1	1.2	1.6	3.1	1.4	2.2	3.7	11
0.80	1.25	4.6	5.2	6.8	14	4.3	6.2	10	28
0.90	1.11	9.4	11	13	31	7.0	11	17	44
0.96	1.04	19	21	26	68	11	19	28	67
0.98	1.02	30	33	38	113	14	27	39	87
0.99	1.01	46	50	55	177	18	37	53	108
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.01	0.07	0.00	0.00	0.01	0.03
0.02	50	0.00	0.00	0.02	0.09	0.00	0.00	0.02	0.06
0.05	20	0.01	0.01	0.04	0.14	0.00	0.01	0.05	0.12
0.10	10	0.03	0.05	0.08	0.20	0.01	0.05	0.10	0.24
0.20	5	0.08	0.13	0.18	0.33	0.06	0.14	0.22	0.51
0.50	2	0.27	0.42	0.55	0.90	0.37	0.73	1.0	2.0
0.80	1.25	0.62	0.82	1.1	2.7	2.0	3.2	4.5	7.2
0.90	1.11	0.85	1.0	1.4	5.0	4.8	6.7	9.6	13
0.96	1.04	1.1	1.2	1.7	10	12	14	21	25
0.98	1.02	1.3	1.3	1.8	16	21	23	35	36
0.99	1.01	1.4	1.4	1.9	25	35	36	47	50

06897950 ELK CREEK NEAR DECATUR CITY, IOWA

LOCATION.—Lat 40°43'18", long 93°56'12", near SE corner sec. 34, T69N, R27W, Decatur County, Hydrologic Unit 10280102, at right downstream corner of bridge on county highway, 1,000 ft downstream from West Elk Creek, 5.2 mi upstream from mouth and 5.7 mi southwest of Decatur City.

DRAINAGE AREA.—52.5 mi^2.

PERIOD OF RECORD.—October 1967 to September 1994 (discontinued; station converted to peak flow measurement site).

GAGE.—Water-stage recorder. Datum of gage is 924.70 ft above sea level. October 1, 1967 to September 30, 1974, at datum 10.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 32,800 ft^3/s, July 5, 1993, gage height, 29.93 ft; no flow at times most years.

Selected values from rating table number 11, developed July 1993

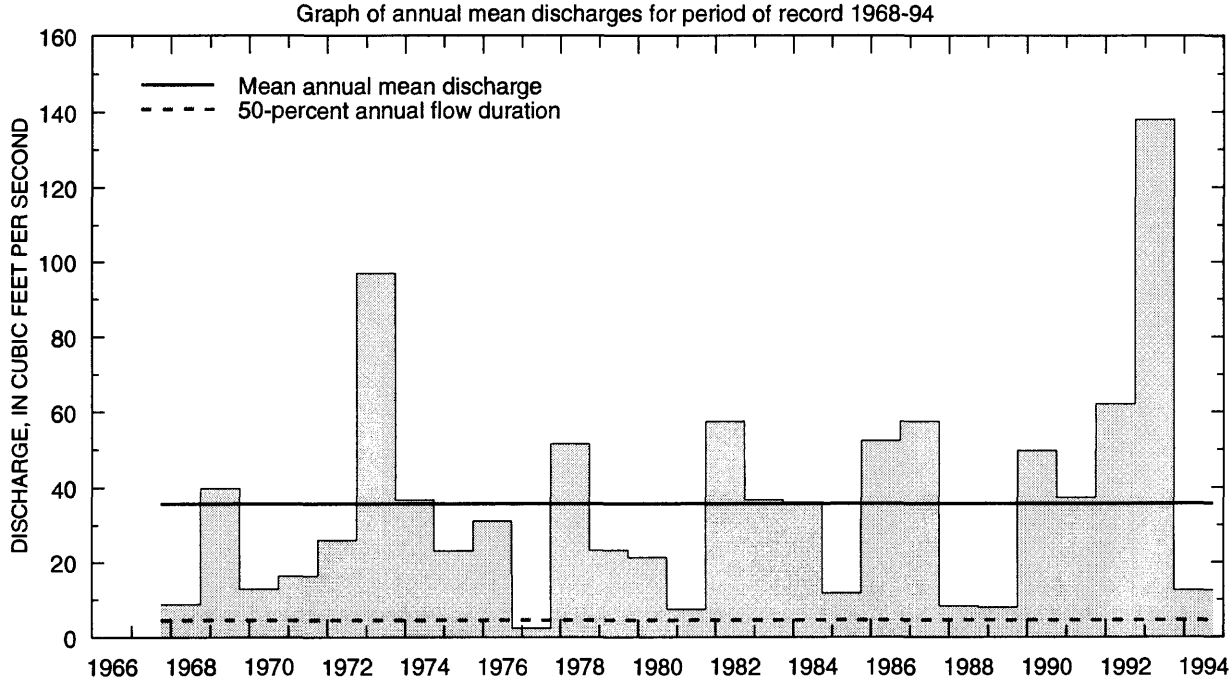
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
11.0	46.8	18.0	3,130
12.0	183	21.0	5,620
13.0	416	24.0	8,840
14.0	789	27.0	14,000
16.0	1,880	30.0	33,400

06897950 ELK CREEK NEAR DECATUR CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1968-94

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	79.5	1986	0.000	1977	14.1	24.8
November	114	1993	0.000	1977	17.1	23.7
December	131	1993	0.000	1977	19.4	31.6
January	125	1973	0.000	1977	14.2	27.2
February	175	1973	0.001	1989	27.9	37.0
March	282	1982	0.14	1989	55.6	64.4
April	253	1973	0.015	1989	68.4	69.1
May	208	1982	0.17	1977	52.1	55.1
June	152	1993	0.000	1977	35.6	43.8
July	895	1993	0.014	1977	67.4	179
August	118	1987	0.001	1971	12.7	25.5
September	344	1992	0.000	1976	44.2	81.1
Annual	138	1993	2.27	1977	35.7	30.0

Graph of annual mean discharges for period of record 1968-94



06897950 ELK CREEK NEAR DECATUR CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1968-94

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.03	0.00	0.00	0.02	0.35	0.67	0.18	0.00	0.00	0.00	0.00	0.00
90	0.00	0.10	0.02	0.01	0.14	2.0	2.4	0.67	0.07	0.00	0.00	0.00	0.01
85	0.00	0.16	0.06	0.04	0.26	3.6	4.3	1.8	0.29	0.01	0.00	0.00	0.07
80	0.03	0.28	0.15	0.14	0.56	4.8	5.3	2.9	0.56	0.03	0.01	0.00	0.19
75	0.09	0.54	0.38	0.50	0.90	6.8	6.7	3.7	0.95	0.08	0.05	0.00	0.43
70	0.16	0.88	0.80	0.90	1.5	8.1	8.5	4.6	1.4	0.17	0.11	0.03	0.81
60	0.57	2.1	2.8	1.8	3.3	11	12	6.8	2.6	0.47	0.27	0.13	2.2
50	1.2	5.6	4.9	2.9	6.2	14	17	11	4.6	1.3	0.60	0.34	4.4
40	2.3	8.3	6.7	4.3	11	19	23	16	7.7	2.6	1.3	1.1	7.4
30	5.6	12	9.8	7.0	17	28	32	22	12	5.5	2.8	3.5	12
25	7.2	14	11	9.0	21	36	39	28	16	7.5	3.5	5.0	16
20	9.4	17	15	12	25	50	50	38	19	11	4.8	7.5	21
15	13	20	21	17	35	78	69	58	28	20	6.1	12	29
10	18	30	30	25	57	128	105	91	44	43	10	25	49
5	42	58	52	50	110	209	286	201	107	192	26	105	110

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 36 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	--
0.95	1.05	924
0.90	1.11	1,440
0.80	1.25	2,360
0.50	2	5,440
0.20	5	10,900
0.10	10	14,800
0.04	25	19,900
0.02	50	23,600
0.01	100	27,100
0.005	200	30,500

Magnitude and frequency of annual high discharges, based on period of record 1968-94

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	72	40	27	16
0.95	1.05	152	80	50	30
0.90	1.11	222	115	70	42
0.80	1.25	343	175	104	63
0.50	2	744	379	216	132
0.20	5	1,500	779	436	265
0.10	10	2,100	1,110	621	377
0.04	25	2,950	1,600	898	542
0.02	50	3,620	2,010	1,130	683
0.01	100	4,340	2,460	1,400	836
0.005	200	5,080	2,940	1,680	1,000

06897950 ELK CREEK NEAR DECATUR CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1968 to March 1994

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.11
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.32
0.20	5	0.00	0.00	0.00	0.00	0.00	0.07	0.13	0.30	1.0
0.50	2	0.00	0.00	0.00	0.00	0.13	0.55	1.1	2.0	6.1
0.80	1.25	0.06	0.09	0.18	0.35	1.1	2.8	5.7	8.4	21
0.90	1.11	0.23	0.33	0.59	1.1	2.9	6.2	12	16	34
0.96	1.04	0.87	1.2	2.0	3.5	7.1	14	27	29	50
0.98	1.02	2.1	2.8	4.3	6.9	12	24	42	42	61
0.99	1.01	5.0	5.9	8.6	13	21	39	60	61	70

Magnitude and frequency of seasonal low discharges, based on period of record October 1967 to September 1994

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
0.10	10	0.00	0.00	0.00	0.07	0.00	0.00	0.06	0.20
0.20	5	0.00	0.03	0.04	0.38	0.05	0.18	0.36	0.96
0.50	2	0.72	1.0	1.3	2.5	0.52	1.2	2.4	7.3
0.80	1.25	4.2	5.4	6.9	11	2.7	4.6	8.6	25
0.90	1.11	7.7	9.9	13	22	5.9	8.7	15	39
0.96	1.04	12	16	23	43	13	16	24	55
0.98	1.02	16	21	32	64	22	25	33	64
0.99	1.01	19	26	40	92	35	37	41	72
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
0.20	5	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.12
0.50	2	0.00	0.00	0.03	0.29	0.09	0.28	0.54	1.1
0.80	1.25	0.12	0.26	0.59	2.0	1.9	2.3	3.4	5.5
0.90	1.11	0.40	0.75	1.6	5.2	4.7	5.6	7.4	11
0.96	1.04	1.3	2.3	4.0	13	10	12	15	22
0.98	1.02	2.7	4.4	6.9	24	15	19	24	32
0.99	1.01	5.3	8.3	12	41	21	29	35	45

06898000 THOMPSON RIVER AT DAVIS CITY, IOWA

LOCATION.—Lat 40°38'25", long 93°48'29", in SE1/4 SE1/4 sec. 35, T68N, R26W, Decatur County, Hydrologic Unit 10280102, on right bank 15 ft downstream from bridge on U.S. Highway 69 at Davis City, 3.1 mi. (revised) upstream from Dickersons Branch, and 5.8 mi (revised) upstream from Iowa-Missouri State line.

DRAINAGE AREA.—701 mi^2.

PERIOD OF RECORD.—May 1918 to December 1921, February 1922 to November 1924, February 1925 to July 1925, July 1941 to September 1996. Monthly discharge only for some periods, published in WSP 1310. Prior to October 1918, published as "Grand River."

GAGE.—Water-stage recorder. Datum of gage is 874.04 ft above sea level. May 14, 1918 to July 2, 1925, July 14, 1941 to February 24, 1942, nonrecording gage, and February 25, 1942 to February 8, 1967, water-stage recorder at same site at datum 2.00 ft higher.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 57,000 ft^3/s, September 16, 1992, gage height, 24.29 ft; minimum daily discharge, 0.10 ft^3/s, June 25, 1956.

Selected values from rating table number 17, developed October 1993

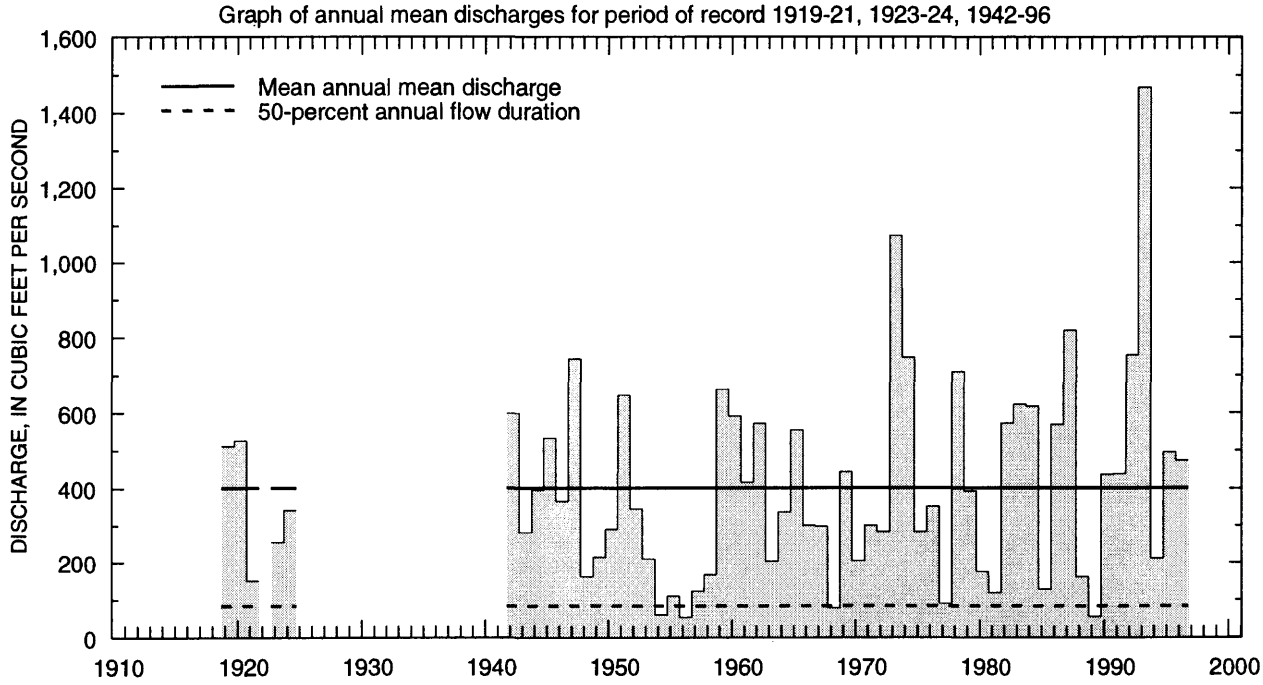
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
1.0	41.0	12.0	11,800
2.0	370	15.0	16,400
4.0	1,770	18.0	21,400
6.0	4,000	21.0	33,000
9.0	7,680	24.0	54,400

06898000 THOMPSON RIVER AT DAVIS CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1919-21, 1923-24, 1942-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	2,138	1974	1.41	1957	201	415
November	1,462	1962	2.07	1956	228	337
December	1,299	1983	0.94	1956	158	261
January	1,292	1960	0.62	1956	166	291
February	1,849	1973	1.14	1956	336	336
March	2,375	1979	10.7	1954	667	555
April	2,586	1973	2.55	1956	706	683
May	3,364	1996	1.19	1956	715	701
June	4,750	1947	3.08	1956	684	796
July	7,239	1993	1.98	1977	425	989
August	2,255	1987	9.35	1955	193	380
September	5,178	1992	4.13	1953	348	748
Annual	1,469	1993	52.3	1956	402	266

Graph of annual mean discharges for period of record 1919-21, 1923-24, 1942-96



06898000 THOMPSON RIVER AT DAVIS CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1919-21, 1923-24, 1942-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.86	2.0	1.0	0.60	0.90	5.1	2.8	1.1	1.7	2.0	1.7	1.5	1.2
95	2.5	4.4	3.9	2.7	4.1	15	29	15	9.1	9.4	6.0	4.6	5.1
90	4.6	8.6	6.0	5.1	9.4	36	50	36	22	16	11	6.7	9.3
85	6.7	11	9.0	8.2	13	54	72	50	39	22	14	9.0	13
80	8.4	14	12	12	22	72	89	68	55	29	18	11	18
75	10	18	14	14	28	99	105	89	70	38	20	13	24
70	12	22	18	16	40	119	123	116	85	46	23	15	33
60	17	31	29	25	66	160	175	167	127	61	30	21	52
50	30	46	42	41	102	232	256	230	182	80	40	31	83
40	48	78	60	53	147	337	341	327	266	108	54	46	130
30	91	120	90	90	242	539	482	468	416	165	79	78	207
25	114	156	114	115	321	688	604	599	526	211	97	119	275
20	145	204	152	150	450	890	778	801	701	284	129	171	367
15	201	289	213	198	577	1,220	1,100	1,100	1,040	420	174	276	525
10	327	450	309	270	908	1,750	1,750	1,780	1,680	723	285	517	867
5	688	936	535	566	1,510	2,990	3,470	3,690	3,240	1,580	644	1,490	1,820

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 74 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	2,140
0.95	1.05	3,120
0.90	1.11	3,820
0.80	1.25	4,900
0.50	2	7,950
0.20	5	13,000
0.10	10	17,000
0.04	25	22,500
0.02	50	27,100
0.01	100	32,000
0.005	200	37,400

Magnitude and frequency of annual high discharges, based on period of record 1919-21, 1923-24, 1942-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	1,350	866	500	321
0.95	1.05	1,970	1,270	785	511
0.90	1.11	2,440	1,570	995	654
0.80	1.25	3,170	2,040	1,320	877
0.50	2	5,390	3,430	2,260	1,530
0.20	5	9,450	5,940	3,820	2,620
0.10	10	12,900	8,000	5,010	3,470
0.04	25	18,000	11,100	6,660	4,650
0.02	50	22,600	13,700	7,990	5,610
0.01	100	27,700	16,700	9,410	6,640
0.005	200	33,600	20,000	10,900	7,730

06898000 THOMPSON RIVER AT DAVIS CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1919 to March 1921, April 1922 to March 1924, April 1942 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.12	0.18	0.27	0.38	0.62	0.92	1.2	1.4	2.2
0.02	50	0.22	0.32	0.44	0.58	0.93	1.4	1.9	2.2	3.5
0.05	20	0.52	0.68	0.86	1.1	1.7	2.4	3.4	4.1	6.8
0.10	10	1.1	1.3	1.5	1.9	2.7	4.0	5.8	7.1	12
0.20	5	2.3	2.6	3.0	3.5	4.9	7.3	11	13	23
0.50	2	8.4	8.7	9.4	11	14	22	33	41	74
0.80	1.25	23	24	26	30	39	65	94	118	214
0.90	1.11	35	37	42	49	65	112	159	197	356
0.96	1.04	52	57	67	81	109	198	272	331	594
0.98	1.02	65	73	89	111	151	284	381	457	813
0.99	1.01	77	90	113	145	200	392	512	605	1,070

Magnitude and frequency of seasonal low discharges, based on period of record July 1918 to December 1921, April 1922 to September 1924, April 1925 to June 1925, October 1941 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.66	0.66	0.67	0.79	0.34	0.84	1.1	1.9
0.02	50	1.0	1.0	1.1	1.3	0.82	1.7	2.3	3.6
0.05	20	1.9	2.0	2.2	2.9	2.7	4.4	5.7	9.0
0.10	10	3.3	3.6	3.9	5.5	6.6	9.4	12	19
0.20	5	6.2	7.0	7.7	11	17	21	26	43
0.50	2	19	22	26	42	58	68	89	162
0.80	1.25	54	63	77	133	114	149	214	445
0.90	1.11	91	105	130	230	137	196	300	676
0.96	1.04	153	172	219	394	153	241	397	981
0.98	1.02	212	233	302	546	160	265	457	1,200
0.99	1.01	281	303	399	722	163	283	507	1,410
		July-August-September				October-November-December			
0.01	100	0.27	0.49	0.88	2.1	0.30	0.44	0.63	0.92
0.02	50	0.46	0.76	1.2	2.8	0.48	0.68	0.94	1.4
0.05	20	0.98	1.4	2.1	4.3	0.96	1.3	1.7	2.6
0.10	10	1.8	2.5	3.3	6.3	1.7	2.3	2.9	4.4
0.20	5	3.7	4.6	5.8	10	3.5	4.5	5.5	8.2
0.50	2	12	14	16	27	12	15	18	27
0.80	1.25	30	37	46	75	40	49	59	82
0.90	1.11	45	59	79	131	71	88	109	146
0.96	1.04	66	94	139	242	128	162	208	265
0.98	1.02	82	125	201	363	185	238	315	387
0.99	1.01	98	159	278	526	256	333	457	541

06898400 WELDON RIVER NEAR LEON, IOWA

LOCATION.—Lat 40°41'45", long 93°38'07", in NE1/4 NE1/4 sec. 17, T68N, R24W, Decatur County, Hydrologic Unit 10280102, on left bank 10 ft downstream from bridge on County Highway A, 200 ft upstream from Unnamed Creek, 1.3 mi downstream from Brush Creek and 6.5 mi southeast of post office at Leon.

DRAINAGE AREA.—104 mi^2.

PERIOD OF RECORD.—October 1958 to September 1991 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 906.26 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 48,600 ft^3/s, August 6, 1959, gage height, 25.27 ft, from rating curve extended above 5,600 ft^3/s on basis of contracted-opening and flow-over-embankment measurement; no flow at times many years.

Selected values from rating table number 8, developed October 1990
(A discharge measurement to validate this rating has not been made since February 1992)

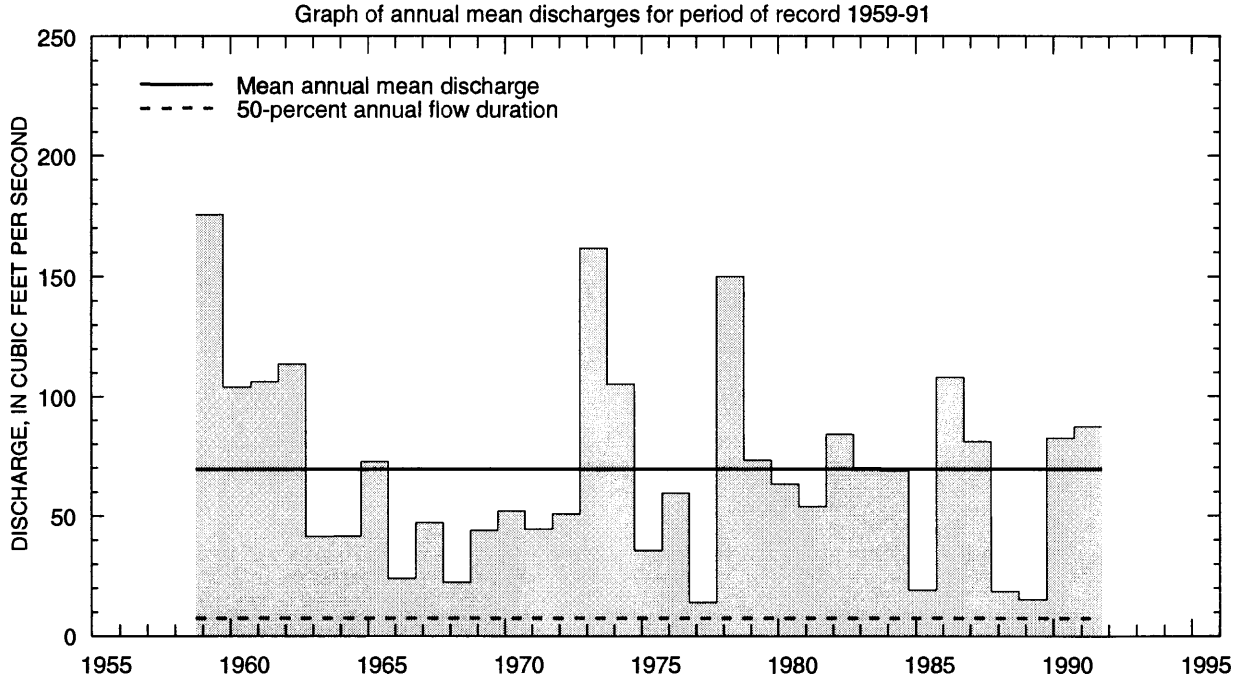
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	6,40	12.0	3,100
5.0	70.9	15.0	4,580
6.0	222	18.0	6,190
7.0	470	21.0	7,850
9.0	1,290	24.0	29,300

06898400 WELDON RIVER NEAR LEON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1959-91

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	554	1978	0.25	1967	60.1	119
November	334	1962	0.32	1990	40.8	62.7
December	191	1983	0.20	1990	27.0	40.2
January	178	1960	0.000	1977	21.0	38.1
February	298	1973	0.26	1989	55.8	68.3
March	428	1973	3.03	1964	126	120
April	487	1991	0.33	1989	142	131
May	626	1959	1.61	1980	115	135
June	409	1967	0.34	1977	82.1	99.7
July	277	1990	0.33	1988	45.5	69.9
August	563	1959	0.29	1975	41.8	104
September	366	1961	0.16	1967	76.6	103
Annual	175	1959	14.0	1977	69.3	41.5

Graph of annual mean discharges for period of record 1959-91



06898400 WELDON RIVER NEAR LEON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1959-91

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.06	0.19	0.11	0.00	0.04	0.52	0.18	0.12	0.00	0.00	0.00	0.00	0.00
95	0.15	0.40	0.28	0.12	0.70	1.6	1.8	1.1	0.40	0.05	0.10	0.04	0.20
90	0.23	0.62	0.35	0.30	1.0	3.6	5.8	1.8	0.73	0.30	0.24	0.10	0.44
85	0.35	0.90	0.56	0.70	1.4	6.6	7.5	2.9	1.1	0.50	0.38	0.20	0.74
80	0.50	1.1	0.94	1.0	2.1	9.6	9.4	4.3	1.8	0.69	0.46	0.33	1.1
75	0.70	1.5	1.4	1.3	2.6	12	12	6.0	2.4	0.90	0.59	0.54	1.6
70	1.0	2.2	2.0	2.0	3.1	15	15	8.6	3.6	1.3	0.77	0.80	2.2
60	1.7	4.8	4.5	3.4	6.1	20	22	13	6.3	2.0	1.2	1.2	4.2
50	2.9	7.7	6.4	4.6	13	28	30	19	9.7	3.0	1.8	1.7	7.4
40	4.2	12	8.7	6.5	20	42	42	25	15	4.8	2.9	2.8	13
30	9.6	17	14	11	32	67	62	39	22	8.5	4.7	5.4	22
25	14	21	18	14	45	92	78	48	27	13	6.1	8.6	28
20	22	27	23	16	58	126	101	67	39	20	8.3	14	39
15	33	36	30	21	78	190	144	104	60	35	13	27	58
10	60	56	40	30	127	312	265	219	113	60	30	67	100
5	200	112	70	70	207	547	772	512	329	154	74	230	260

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 41 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,470
0.95	1.05	2,140
0.90	1.11	2,640
0.80	1.25	3,430
0.50	2	5,810
0.20	5	10,200
0.10	10	13,800
0.04	25	19,300
0.02	50	24,200
0.01	100	29,700
0.005	200	35,900

Magnitude and frequency of annual high discharges, based on period of record 1959-91

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	259	140	92	57
0.95	1.05	457	246	160	99
0.90	1.11	607	326	210	129
0.80	1.25	843	448	284	175
0.50	2	1,500	779	472	293
0.20	5	2,500	1,260	718	453
0.10	10	3,190	1,580	865	552
0.04	25	4,050	1,970	1,030	667
0.02	50	4,690	2,240	1,140	745
0.01	100	5,310	2,510	1,240	817
0.005	200	5,930	2,760	1,330	885

06898400 WELDON RIVER NEAR LEON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1959 to March 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.05	0.08	0.09	0.16
0.02	50	0.00	0.00	0.00	0.00	0.00	0.08	0.13	0.16	0.29
0.05	20	0.00	0.00	0.00	0.00	0.03	0.15	0.26	0.36	0.68
0.10	10	0.00	0.00	0.00	0.02	0.08	0.27	0.48	0.71	1.4
0.20	5	0.00	0.00	0.02	0.10	0.20	0.54	1.0	1.6	3.2
0.50	2	0.13	0.18	0.27	0.42	0.80	2.1	3.9	6.4	13
0.80	1.25	0.59	0.70	1.0	1.3	2.6	8.2	15	22	46
0.90	1.11	1.1	1.3	1.8	2.4	4.4	17	29	41	82
0.96	1.04	1.8	2.2	2.9	4.4	7.6	35	60	75	145
0.98	1.02	2.5	3.0	3.8	6.4	11	57	96	108	205
0.99	1.01	3.3	4.1	4.8	9.0	14	88	144	148	275

Magnitude and frequency of seasonal low discharges, based on period of record October 1958 to September 1991

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.16
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.31
0.05	20	0.00	0.03	0.06	0.31	0.00	0.04	0.31	0.75
0.10	10	0.06	0.12	0.19	0.65	0.11	0.20	0.61	1.6
0.20	5	0.30	0.42	0.54	1.3	0.33	0.68	1.3	3.5
0.50	2	2.1	2.3	2.5	4.6	1.5	3.3	4.6	13
0.80	1.25	6.9	7.6	8.9	15	4.6	8.2	13	38
0.90	1.11	11	12	16	27	7.5	11	20	59
0.96	1.04	16	18	27	51	12	14	29	89
0.98	1.02	19	22	37	77	16	16	37	112
0.99	1.01	22	26	48	112	20	20	45	134
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.03	0.00	0.02	0.05	0.06
0.02	50	0.00	0.00	0.00	0.04	0.00	0.04	0.07	0.10
0.05	20	0.00	0.00	0.00	0.09	0.00	0.07	0.13	0.21
0.10	10	0.00	0.01	0.05	0.17	0.02	0.13	0.23	0.38
0.20	5	0.00	0.07	0.14	0.36	0.14	0.27	0.45	0.79
0.50	2	0.16	0.35	0.55	1.3	0.73	1.0	1.6	2.9
0.80	1.25	0.63	1.2	1.7	4.2	2.9	4.1	5.8	9.7
0.90	1.11	1.1	2.0	2.8	7.3	5.8	8.3	11	18
0.96	1.04	1.8	3.2	4.7	13	12	17	23	32
0.98	1.02	2.4	4.3	6.5	18	19	28	37	47
0.99	1.01	3.1	5.5	8.6	24	29	44	56	66

06903400 CHARITON RIVER NEAR CHARITON, IOWA

LOCATION.—Lat 40°57'12", long 93°15'37", in SW1/4 NE1/4 sec. 15, T71N, R21W, Lucas County, Hydrologic Unit 10280201, on right bank 15 ft downstream from bridge on County Highway S43, 0.1 mi (revised) downstream from Wolf Creek and 5.0 mi southeast of Chariton.

DRAINAGE AREA.—182 mi^2.

PERIOD OF RECORD.—October 1965 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 917.90 ft above sea level (U.S. Army Corps of Engineers benchmark).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 37,700 ft^3/s, September 15, 1992, gage height, 29.32 ft; no flow at times many years.

Selected values from rating table number 13, developed October 1996

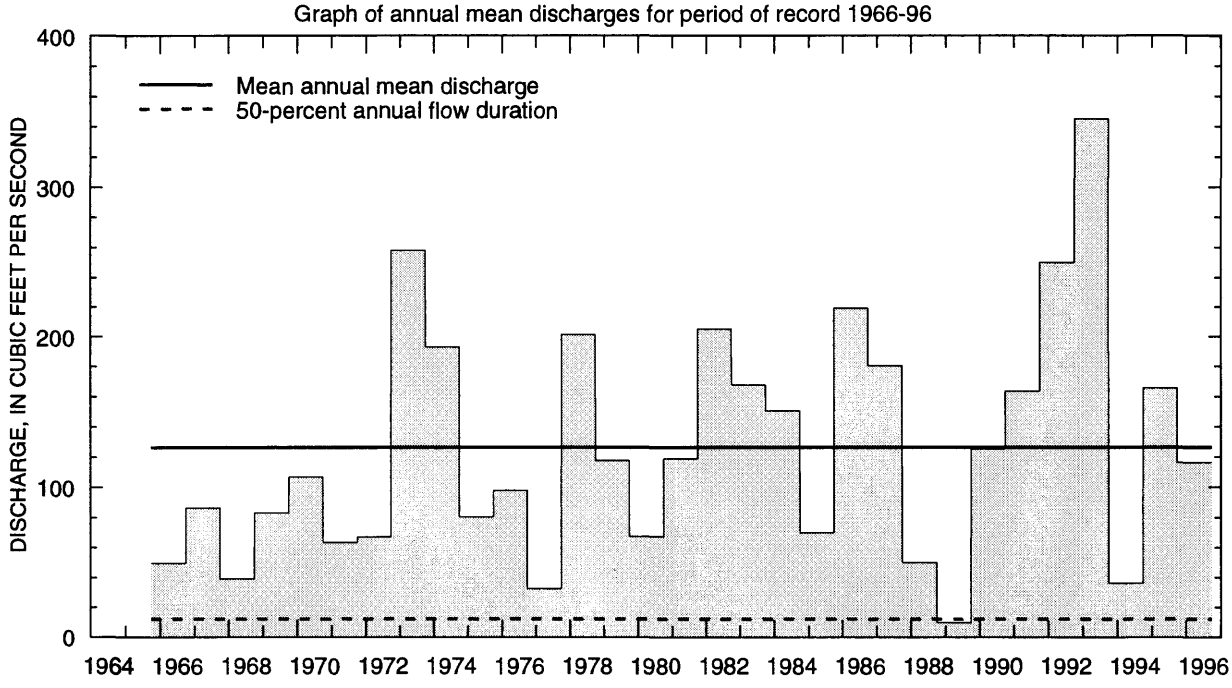
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
5.1	3.90	10.0	351
6.0	25.0	12.0	661
7.0	70.9	14.0	1,080
8.0	141	17.0	2,960
9.0	234	20.0	10,000

06903400 CHARITON RIVER NEAR CHARITON, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1966-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	568	1974	0.005	1990	82.6	164
November	294	1993	0.003	1990	59.5	79.5
December	408	1983	0.000	1990	65.4	99.0
January	340	1974	0.23	1977	35.8	67.5
February	364	1973	0.22	1989	76.5	87.4
March	761	1979	6.40	1989	172	171
April	1,093	1991	0.068	1989	236	242
May	1,097	1995	3.91	1977	229	280
June	856	1967	0.38	1988	160	194
July	1,711	1993	0.000	1988	179	336
August	618	1987	0.10	1989	77.1	133
September	1,704	1992	0.086	1991	142	317
Annual	345	1993	9.71	1989	126	78.4

Graph of annual mean discharges for period of record 1966-96



06903400 CHARITON RIVER NEAR CHARITON, IOWA—Continued

Monthly and annual flow durations, based on period of record 1966-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.10	0.17	0.59	0.02	0.16	0.00	0.00	0.00	0.00	0.00
95	0.00	0.02	0.08	0.23	1.6	3.5	5.3	2.2	0.54	0.03	0.08	0.05	0.19
90	0.20	0.50	0.40	0.50	2.2	10	9.6	4.0	1.1	0.33	0.30	0.20	0.55
85	0.36	0.81	0.88	1.6	2.9	14	12	5.5	1.9	0.61	0.50	0.39	1.0
80	0.50	1.2	2.0	2.3	3.7	18	14	7.4	3.1	1.0	0.81	0.51	1.6
75	0.64	1.9	3.4	3.0	5.4	22	18	9.5	4.0	1.3	0.98	0.67	2.5
70	0.82	2.9	4.5	3.5	6.4	25	22	12	5.1	1.8	1.1	0.83	3.5
60	1.7	6.0	7.8	5.2	9.4	34	30	19	8.9	2.7	2.0	1.2	6.9
50	3.3	10	11	7.1	16	45	43	28	16	4.2	2.9	1.7	12
40	5.6	16	16	9.3	22	60	66	44	28	9.6	4.6	3.7	21
30	13	27	25	18	36	89	121	82	51	26	8.3	12	36
25	16	34	33	21	50	133	167	127	75	48	12	20	49
20	21	45	46	24	73	224	251	221	113	93	19	30	74
15	33	64	71	35	100	351	451	437	191	174	35	61	130
10	75	113	130	51	177	520	736	751	481	412	78	216	281
5	386	277	349	159	371	970	1,300	1,290	1,090	982	384	674	732

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 31 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	648
0.95	1.05	1,090
0.90	1.11	1,440
0.80	1.25	2,020
0.50	2	3,910
0.20	5	7,670
0.10	10	11,000
0.04	25	16,100
0.02	50	20,700
0.01	100	26,000
0.005	200	32,100

Magnitude and frequency of annual high discharges, based on period of record 1966-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	624	308	150	77
0.95	1.05	827	467	259	147
0.90	1.11	981	584	341	203
0.80	1.25	1,230	769	470	293
0.50	2	2,040	1,310	834	553
0.20	5	3,690	2,270	1,410	958
0.10	10	5,230	3,040	1,820	1,240
0.04	25	7,810	4,170	2,350	1,590
0.02	50	10,300	5,130	2,750	1,840
0.01	100	13,400	6,180	3,160	2,090
0.005	200	17,100	7,350	3,570	2,330

06903400 CHARITON RIVER NEAR CHARITON, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1966 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.13
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.26
0.05	20	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.20	0.65
0.10	10	0.00	0.00	0.00	0.00	0.08	0.14	0.26	0.49	1.4
0.20	5	0.05	0.05	0.09	0.14	0.25	0.38	0.78	1.4	3.6
0.50	2	0.31	0.35	0.43	0.60	1.1	2.2	4.8	8.2	18
0.80	1.25	1.1	1.3	1.5	2.0	4.1	11	24	40	75
0.90	1.11	2.1	2.3	2.8	3.7	7.9	27	54	86	147
0.96	1.04	4.0	4.2	5.3	7.1	15	68	125	182	286
0.98	1.02	6.2	6.2	8.0	11	24	124	211	287	429
0.99	1.01	8.8	8.8	12	16	35	213	338	423	607

Magnitude and frequency of seasonal low discharges, based on period of record October 1965 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.00	0.05	0.08	0.15	0.00	0.00	0.00	0.05
0.02	50	0.00	0.08	0.13	0.25	0.00	0.00	0.00	0.12
0.05	20	0.07	0.20	0.28	0.52	0.02	0.04	0.05	0.45
0.10	10	0.25	0.41	0.53	0.98	0.17	0.26	0.39	1.3
0.20	5	0.71	0.90	1.1	2.1	0.68	0.99	1.7	4.0
0.50	2	3.2	3.4	4.0	7.8	3.6	5.1	9.6	24
0.80	1.25	9.3	10	13	27	8.6	12	23	88
0.90	1.11	15	17	22	48	11	15	30	146
0.96	1.04	22	27	38	89	13	18	35	225
0.98	1.02	27	35	53	130	13	19	37	280
0.99	1.01	33	44	70	180	14	20	39	332
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	20	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
0.10	10	0.00	0.01	0.04	0.11	0.01	0.07	0.10	0.22
0.20	5	0.04	0.10	0.13	0.30	0.14	0.23	0.33	0.72
0.50	2	0.32	0.50	0.74	1.8	0.90	1.2	1.8	3.5
0.80	1.25	1.4	2.1	3.4	11	4.4	5.5	8.2	13
0.90	1.11	3.0	4.4	7.4	28	9.8	12	18	25
0.96	1.04	6.6	9.4	17	79	23	26	39	48
0.98	1.02	11	16	28	156	40	44	64	72
0.99	1.01	19	25	46	291	66	71	103	104

06903500 HONEY CREEK NEAR RUSSELL, IOWA

LOCATION.—Lat 40°55'25", long 93°07'55", in SW1/4 NW1/4 sec. 26, T71N, R20W, on left bank 15 ft downstream from highway bridge, 0.7 mile upstream from Chariton River and 5.5 miles southeast of Russell.

DRAINAGE AREA.—13.2 mi^2.

PERIOD OF RECORD.—June 1952 to September 1962 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 901.73 ft above sea level (levels by Soil Conservation Service).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 4,100 ft^3/s, May 21, 1959, gage height, 11.26 ft, from rating curve extended above 40 ft^3/s on basis of contracted-opening and flow-over-embankment measurement of peak flow; no flow at times most years.

Selected values from rating table developed October 1961 (A discharge measurement to validate this rating has not been made since September 1962)

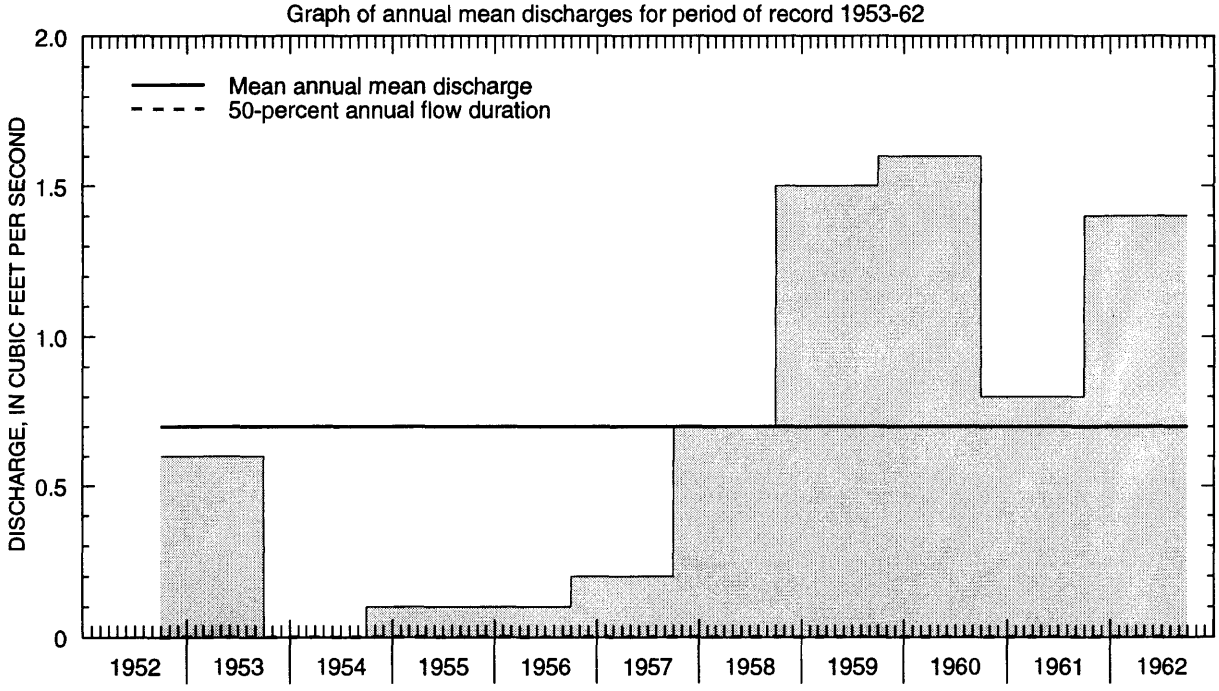
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.6	0.1	4.0	46
2.8	1.1	5.0	108
3.0	3.4	6.0	177
3.5	20	8.0	463

06903500 HONEY CREEK NEAR RUSSELL, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1953-62

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	0.99	1962	0.000	1953	0.24	0.37
November	4.14	1962	0.000	1956	0.59	1.27
December	0.87	1960	0.000	1956	0.16	0.27
January	1.42	1960	0.000	1956	0.29	0.50
February	3.60	1962	0.000	1956	0.97	1.16
March	6.05	1960	0.000	1954	2.34	2.44
April	2.87	1959	0.000	1956	0.96	1.08
May	6.61	1959	0.000	1956	1.46	2.37
June	0.96	1960	0.000	1956	0.35	0.34
July	4.09	1958	0.000	1954	0.54	1.25
August	1.12	1956	0.000	1953	0.21	0.37
September	1.96	1961	0.000	1953	0.36	0.63
Annual	1.61	1960	0.041	1954	0.70	0.60

Graph of annual mean discharges for period of record 1953-62



06903500 HONEY CREEK NEAR RUSSELL, IOWA—Continued

Monthly and annual flow durations, based on period of record 1953-62

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.01	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00	0.00	0.10	0.14	0.04	0.01	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.03	0.17	0.23	0.09	0.02	0.00	0.00	0.00	0.00
50	0.00	0.04	0.05	0.04	0.10	0.20	0.30	0.15	0.03	0.00	0.00	0.00	0.03
40	0.00	0.10	0.08	0.06	0.26	0.38	0.35	0.22	0.07	0.01	0.00	0.00	0.10
30	0.08	0.15	0.11	0.11	0.50	0.89	0.46	0.34	0.11	0.04	0.02	0.01	0.17
25	0.10	0.18	0.13	0.14	0.91	1.2	0.53	0.43	0.15	0.06	0.03	0.02	0.23
20	0.14	0.23	0.17	0.20	1.2	1.9	0.63	0.60	0.19	0.13	0.06	0.05	0.32
15	0.17	0.31	0.24	0.28	1.7	3.4	0.93	0.82	0.26	0.19	0.13	0.11	0.47
10	0.30	0.53	0.35	0.40	2.5	6.0	1.5	1.7	0.52	0.38	0.28	0.19	0.90
5	0.84	2.0	0.51	0.94	4.5	11	3.8	6.4	2.0	1.4	0.64	0.58	2.8

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 11 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	57
0.95	1.05	118
0.90	1.11	171
0.80	1.25	267
0.50	2	609
0.20	5	1,350
0.10	10	2,010
0.04	25	3,050
0.02	50	3,980
0.01	100	5,030
0.005	200	6,220

Magnitude and frequency of annual high discharges, based on period of record 1953-62

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	0.91	0.45	0.26	0.11
0.95	1.05	2.0	1.0	0.64	0.35
0.90	1.11	2.9	1.6	1.0	0.60
0.80	1.25	4.8	2.5	1.7	1.1
0.50	2	12	6.3	4.2	2.9
0.20	5	29	15	9.3	6.4
0.10	10	45	23	13	8.9
0.04	25	73	36	20	12
0.02	50	98	48	24	14
0.01	100	129	61	29	16
0.005	200	165	76	35	18

06903500 HONEY CREEK NEAR RUSSELL, IOWA—Continued

(Annual and seasonal low-flow probability tables
not produced because of insufficient data.)

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOWA

LOCATION.—Lat 40°48'02", long 93°11'32", in SW1/4 SW1/4 sec. 5, T69N, R20W, Wayne County, Hydrologic Unit 10280201, on right bank 20 ft downstream from bridge on County Highway S50, 1.3 mi downstream from Jordan Creek and 4.3 mi northwest of Promise City.

DRAINAGE AREA.—168 mi^2.

PERIOD OF RECORD.—October 1967 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 913.70 ft above sea level (U.S. Army Corps of Engineers benchmark.)

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 70,600 ft^3/s, September 15, 1992, gage height, 34.84 ft; no flow July 6–7, 21–24, 28–August 1, 1977, July 9–10, August 14, 18–22, 1989.

Selected values from rating table number 6, developed October 1994

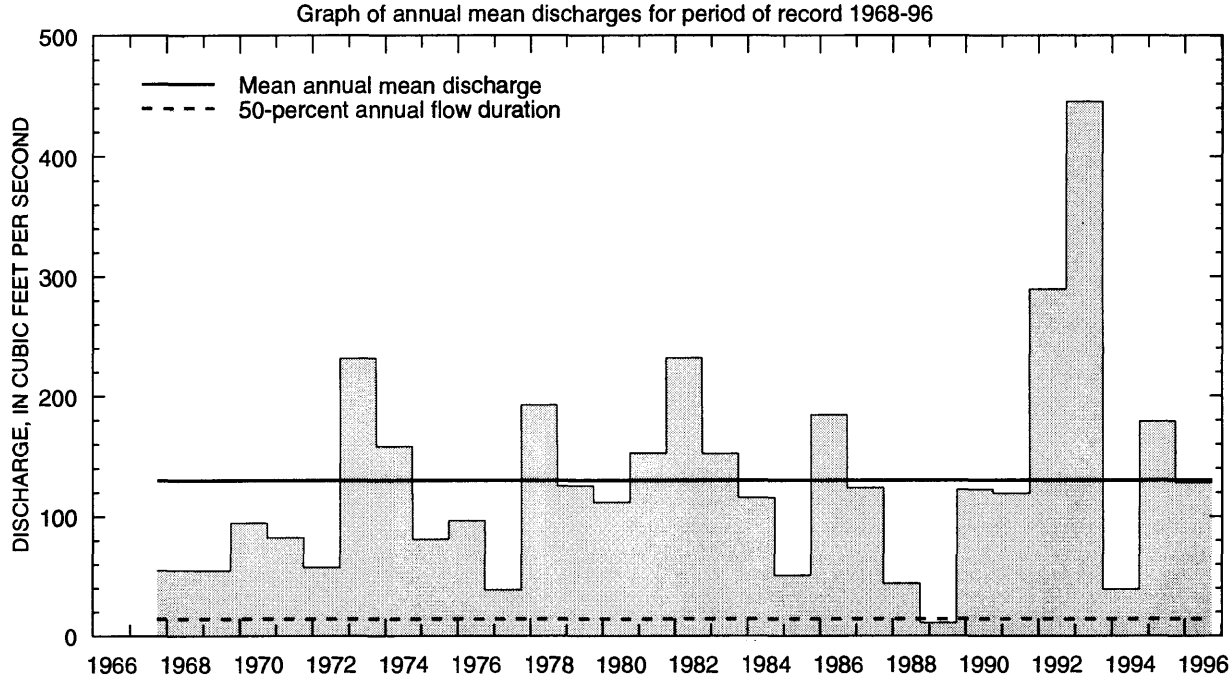
Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
4.0	56.3	12.0	1,830
5.0	173	15.0	2,850
6.0	334	18.0	4,830
8.0	736	21.0	8,510
10.0	1,240	25.5	17,000

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOWA—Continued

Statistics of monthly mean and annual mean discharges, based on period of record 1968-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	498	1978	0.15	1989	98.5	162
November	357	1993	0.39	1990	59.0	80.6
December	440	1983	0.40	1977	67.7	110
January	335	1974	0.19	1977	36.9	67.7
February	337	1971	0.88	1989	81.3	85.6
March	853	1979	3.21	1989	174	193
April	730	1991	1.21	1989	238	231
May	1,043	1995	5.14	1980	227	280
June	580	1980	1.18	1988	150	159
July	2,351	1993	0.24	1977	211	475
August	300	1993	0.76	1984	53.2	84.2
September	2,227	1992	0.53	1991	161	417
Annual	446	1993	10.7	1989	130	89.7

Graph of annual mean discharges for period of record 1968-96



06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOWA—Continued

Monthly and annual flow durations, based on period of record 1968-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.07	0.03	0.09	0.17	0.20	1.8	0.64	0.45	0.30	0.00	0.01	0.13	0.12
95	0.17	0.41	0.31	0.45	1.0	5.9	6.5	3.2	0.78	0.17	0.27	0.34	0.42
90	0.29	0.98	0.70	1.0	2.5	11	10	5.0	1.2	0.60	0.46	0.55	0.90
85	0.52	1.6	1.5	1.7	3.5	16	13	6.8	1.8	0.94	0.65	0.69	1.4
80	0.82	2.1	2.5	2.7	4.5	19	16	8.2	2.5	1.4	0.87	0.82	2.1
75	1.0	3.0	3.9	3.6	6.0	23	19	12	3.9	1.6	1.2	0.97	3.1
70	1.5	4.6	5.2	4.3	8.5	27	23	14	5.5	2.0	1.5	1.2	4.4
60	2.6	7.0	9.4	6.4	11	34	33	21	8.5	3.7	2.1	1.7	8.2
50	4.5	12	12	8.7	18	42	46	31	15	6.5	3.0	2.5	14
40	11	19	17	12	26	60	67	44	23	10	5.0	4.5	23
30	20	29	29	18	45	92	102	73	39	22	8.7	13	38
25	28	35	35	22	60	111	133	101	60	38	12	21	50
20	42	43	43	31	74	150	186	149	81	67	18	33	70
15	64	60	62	43	100	237	262	230	130	119	32	58	109
10	135	93	114	64	150	403	580	444	248	303	66	154	202
5	423	272	266	110	305	800	1,150	1,110	615	1,070	202	686	534

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	1,390
0.95	1.05	2,080
0.90	1.11	2,610
0.80	1.25	3,440
0.50	2	5,980
0.20	5	10,700
0.10	10	14,700
0.04	25	20,800
0.02	50	26,100
0.01	100	32,100
0.005	200	39,000

Magnitude and frequency of annual high discharges, based on period of record 1968-96

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	478	211	132	72
0.95	1.05	738	372	233	138
0.90	1.11	939	500	313	191
0.80	1.25	1,270	712	443	280
0.50	2	2,330	1,380	840	553
0.20	5	4,440	2,620	1,540	1,030
0.10	10	6,320	3,630	2,090	1,390
0.04	25	9,330	5,130	2,860	1,880
0.02	50	12,100	6,380	3,480	2,270
0.01	100	15,300	7,750	4,150	2,660
0.005	200	19,100	9,250	4,850	3,070

06903700 SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, IOWA—Continued

Magnitude and frequency of annual low discharges, based on period of record April 1968 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	0.00	0.00	0.01	0.05	0.09	0.13	0.23	0.52
0.02	50	0.00	0.00	0.00	0.02	0.08	0.13	0.20	0.35	0.81
0.05	20	0.00	0.00	0.01	0.04	0.14	0.23	0.39	0.67	1.6
0.10	10	0.00	0.03	0.04	0.09	0.23	0.39	0.70	1.2	2.8
0.20	5	0.11	0.11	0.12	0.21	0.43	0.75	1.4	2.4	5.5
0.50	2	0.50	0.56	0.63	0.88	1.4	2.8	5.5	9.2	20
0.80	1.25	1.8	2.1	2.4	3.2	4.4	12	22	36	69
0.90	1.11	3.6	4.0	4.7	5.8	8.1	26	45	73	130
0.96	1.04	7.1	7.4	8.9	11	15	61	99	156	253
0.98	1.02	11	11	13	15	23	109	163	254	387
0.99	1.01	17	18	19	21	33	184	257	396	565

Magnitude and frequency of seasonal low discharges, based on period of record October 1967 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.08	0.10	0.11	0.21	0.06	0.09	0.19	0.38
0.02	50	0.14	0.16	0.19	0.34	0.11	0.16	0.30	0.65
0.05	20	0.28	0.35	0.40	0.68	0.24	0.35	0.60	1.4
0.10	10	0.51	0.64	0.75	1.2	0.47	0.67	1.1	2.7
0.20	5	1.0	1.3	1.5	2.5	0.96	1.4	2.1	5.8
0.50	2	3.2	4.1	5.1	8.9	3.0	4.2	6.6	23
0.80	1.25	8.7	11	15	28	7.4	10	18	81
0.90	1.11	14	16	24	50	11	15	29	149
0.96	1.04	21	24	37	87	15	22	46	278
0.98	1.02	27	31	49	124	18	26	60	407
0.99	1.01	34	37	62	167	21	31	76	568
		July-August-September				October-November-December			
0.01	100	0.00	0.00	0.03	0.14	0.01	0.01	0.02	0.05
0.02	50	0.00	0.00	0.04	0.17	0.01	0.02	0.03	0.10
0.05	20	0.00	0.03	0.08	0.24	0.03	0.05	0.08	0.23
0.10	10	0.07	0.09	0.14	0.35	0.07	0.12	0.19	0.47
0.20	5	0.16	0.19	0.27	0.59	0.20	0.32	0.49	1.1
0.50	2	0.58	0.80	1.1	1.9	1.2	1.8	2.7	5.0
0.80	1.25	2.3	3.2	4.6	8.2	6.5	8.4	12	20
0.90	1.11	4.8	6.7	10	20	15	18	26	39
0.96	1.04	11	15	24	55	33	39	54	76
0.98	1.02	20	26	44	114	55	62	86	116
0.99	1.01	35	42	74	226	85	93	126	166

06903900 CHARITON RIVER NEAR RATHBUN, IOWA

LOCATION.—Lat 40°49'22", long 92°53'22", in SE1/4 NE1/4 sec. 35, T70N, R18W, Appanoose County, Hydrologic Unit 10280201, on left bank 600 ft downstream from outlet of Rathbun Dam, 1.8 mi north of Rathbun, 3.7 mi upstream from Walnut Creek, and at mile 142.1.

DRAINAGE AREA.—549 mi^2.

PERIOD OF RECORD.—October 1956 to September 1996. Monthly discharge only for some periods, published in WSP 1730.

GAGE.—Water-stage recorder. Datum of gage is 847.92 ft above sea level. Prior to November 16, 1960, nonrecording gage and November 17, 1960, to September 30, 1969, recording gage, at site 3.1 mi downstream at datum 4.65 ft lower.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 21,800 ft^3/s, March 31, 1960, gage height, 25.3 ft, from flood mark at site and datum then in use; no flow October 26, 1977.

REMARKS.—Flow regulated since November 21, 1969, by dam at Rathbun Lake (station 06903880) 600 ft upstream. Discharge records include fish hatchery diversions that bypass gage.

Selected values from rating table number 15, developed October 1996

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.0	2.29	7.0	600
3.0	72.3	8.0	780
4.0	165	10.0	1,200
5.0	291	12.0	1,780
6.0	441	15.0	2,780

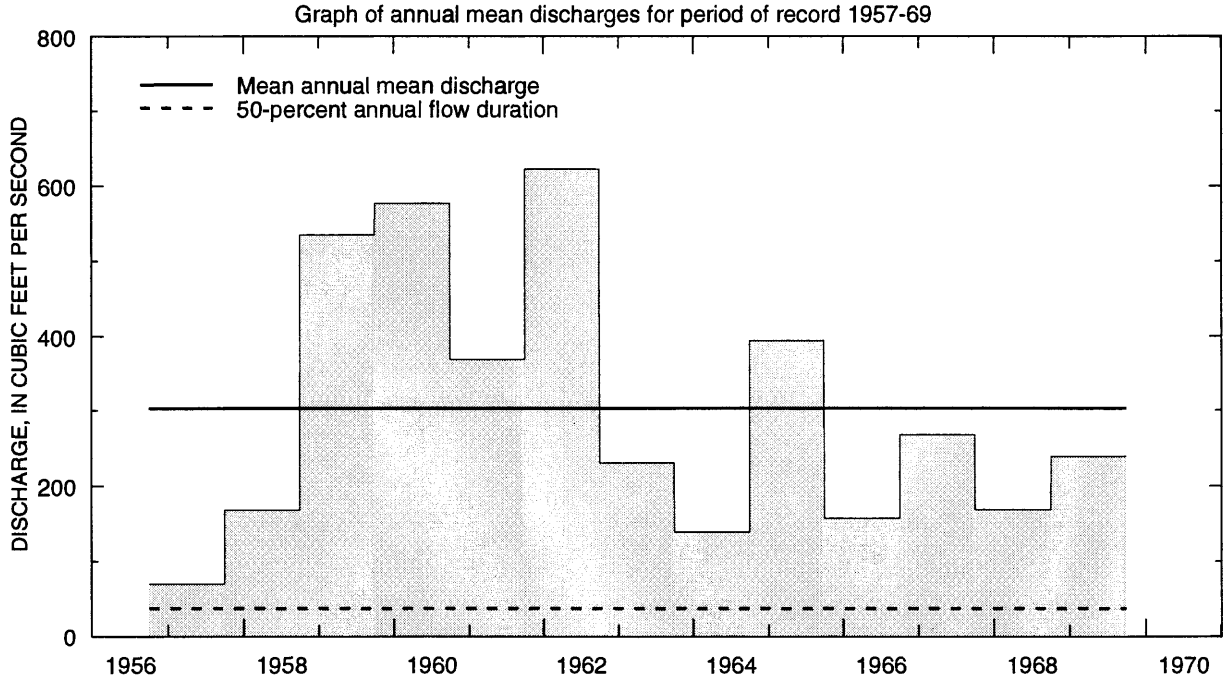
06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1957-69

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	578	1962	0.32	1957	134	199
November	2,453	1962	0.70	1957	260	665
December	230	1966	1.83	1957	57.9	76.1
January	870	1960	0.86	1957	168	243
February	1,140	1962	2.86	1957	297	319
March	1,705	1961	1.72	1957	699	695
April	1,529	1965	74.5	1958	554	505
May	2,047	1959	89.9	1965	499	637
June	2,422	1967	15.7	1963	443	657
July	782	1969	11.3	1965	165	231
August	475	1958	2.68	1965	83.5	135
September	1,455	1965	4.82	1966	286	472
Annual	622	1962	69.8	1957	303	181

Graph of annual mean discharges for period of record 1957-69



06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1957-69

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.10	0.50	1.3	0.70	0.50	0.20	18	7.5	2.9	0.40	1.2	1.1	0.30
95	0.20	0.70	1.5	0.80	3.5	1.9	36	12	5.0	2.3	1.9	2.4	1.2
90	0.30	0.90	1.9	1.2	5.3	7.8	47	23	6.4	3.8	2.4	3.1	2.5
85	0.40	1.4	2.1	1.7	6.4	13	64	33	8.9	4.6	2.9	3.5	4.1
80	0.70	1.9	3.1	3.4	7.4	26	79	42	12	5.9	3.2	4.0	5.9
75	1.6	4.0	4.5	9.2	12	40	96	50	16	7.5	3.8	4.9	8.5
70	2.4	8.6	5.9	13	17	53	114	57	18	9.6	4.4	5.9	12
60	6.2	12	11	17	30	96	147	76	27	16	5.8	9.2	21
50	11	24	20	20	84	145	191	111	42	23	8.9	16	37
40	23	38	27	27	140	237	255	180	83	37	14	28	67
30	39	53	34	90	230	422	406	335	204	65	28	48	132
25	53	62	42	130	300	900	556	444	344	104	40	75	182
20	89	86	55	181	450	1,360	797	638	496	172	58	142	273
15	160	180	80	284	694	1,620	1,090	906	748	306	87	241	455
10	359	490	108	512	1,000	1,930	1,410	1,280	1,430	634	174	483	870
5	1,050	1,120	170	832	1,530	2,520	2,340	2,150	2,630	1,030	459	1,380	1,540

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	546
0.95	1.05	1,080
0.90	1.11	1,550
0.80	1.25	2,350
0.50	2	5,060
0.20	5	10,500
0.10	10	15,000
0.04	25	21,900
0.02	50	27,700
0.01	100	34,100
0.005	200	41,100

[a] Analysis includes area-weighted peak discharges (1938-56) computed from station 06904000 Chariton River near Centerville.

Magnitude and frequency of annual high discharges, based on period of record 1957-69

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	540	530	323	200
0.95	1.05	1,050	926	591	383
0.90	1.11	1,410	1,200	797	527
0.80	1.25	2,020	1,630	1,120	755
0.50	2	4,050	2,930	2,040	1,390
0.20	5	8,210	5,220	3,430	2,320
0.10	10	11,900	7,050	4,370	2,930
0.04	25	17,800	9,690	5,560	3,660
0.02	50	23,100	11,900	6,410	4,170
0.01	100	29,300	14,300	7,250	4,650
0.005	200	36,300	16,800	8,060	5,100

06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record
April 1957 to March 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.02	0.02	0.03	0.04	0.25	0.94	0.94	0.96	1.0
0.02	50	0.04	0.04	0.05	0.09	0.36	1.2	1.3	1.4	1.8
0.05	20	0.08	0.09	0.12	0.22	0.62	1.9	2.2	2.5	3.9
0.10	10	0.15	0.18	0.25	0.44	0.99	2.7	3.6	4.9	7.5
0.20	5	0.29	0.37	0.53	0.91	1.7	4.3	6.5	10	16
0.50	2	0.94	1.2	1.7	2.6	4.7	10	20	35	57
0.80	1.25	2.4	2.8	3.8	4.8	12	26	60	95	170
0.90	1.11	3.6	4.1	5.1	5.9	19	42	108	147	282
0.96	1.04	5.2	5.7	6.6	6.7	30	72	200	221	461
0.98	1.02	6.4	6.8	7.4	7.5	40	102	297	330	618
0.99	1.01	7.6	7.8	8.1	8.5	51	139	424	470	791

Magnitude and frequency of seasonal low discharges, based on period of record
October 1956 to September 1969

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.07	0.12	0.19	0.29	1.3	2.7	3.2	8.0
0.02	50	0.14	0.20	0.31	0.53	1.6	2.9	3.8	9.9
0.05	20	0.34	0.45	0.64	1.3	2.1	3.5	5.0	14
0.10	10	0.74	0.91	1.2	2.8	2.7	4.3	6.5	19
0.20	5	1.8	2.0	2.5	6.6	3.8	5.5	9.2	28
0.50	2	8.2	8.6	10	30	7.7	10	20	66
0.80	1.25	31	32	38	117	16	23	47	167
0.90	1.11	59	62	75	221	25	38	80	283
0.96	1.04	108	118	152	416	41	68	145	511
0.98	1.02	156	177	238	610	56	103	218	762
0.99	1.01	214	251	353	846	75	152	321	1,100
		July-August-September				October-November-December			
0.01	100	0.16	0.32	0.88	1.1	0.01	0.01	0.02	0.08
0.02	50	0.22	0.43	1.0	1.3	0.02	0.03	0.04	0.15
0.05	20	0.33	0.65	1.2	1.6	0.05	0.07	0.12	0.38
0.10	10	0.48	0.93	1.5	2.1	0.11	0.18	0.28	0.84
0.20	5	0.75	1.4	2.0	3.2	0.28	0.50	0.75	2.1
0.50	2	1.7	3.0	3.8	8.1	1.6	3.0	4.6	9.9
0.80	1.25	3.6	6.1	8.4	27	8.3	15	24	39
0.90	1.11	5.2	8.7	13	57	19	32	55	74
0.96	1.04	7.8	12	23	141	47	68	126	138
0.98	1.02	10	15	33	265	81	108	211	220
0.99	1.01	12	19	47	486	134	161	332	350

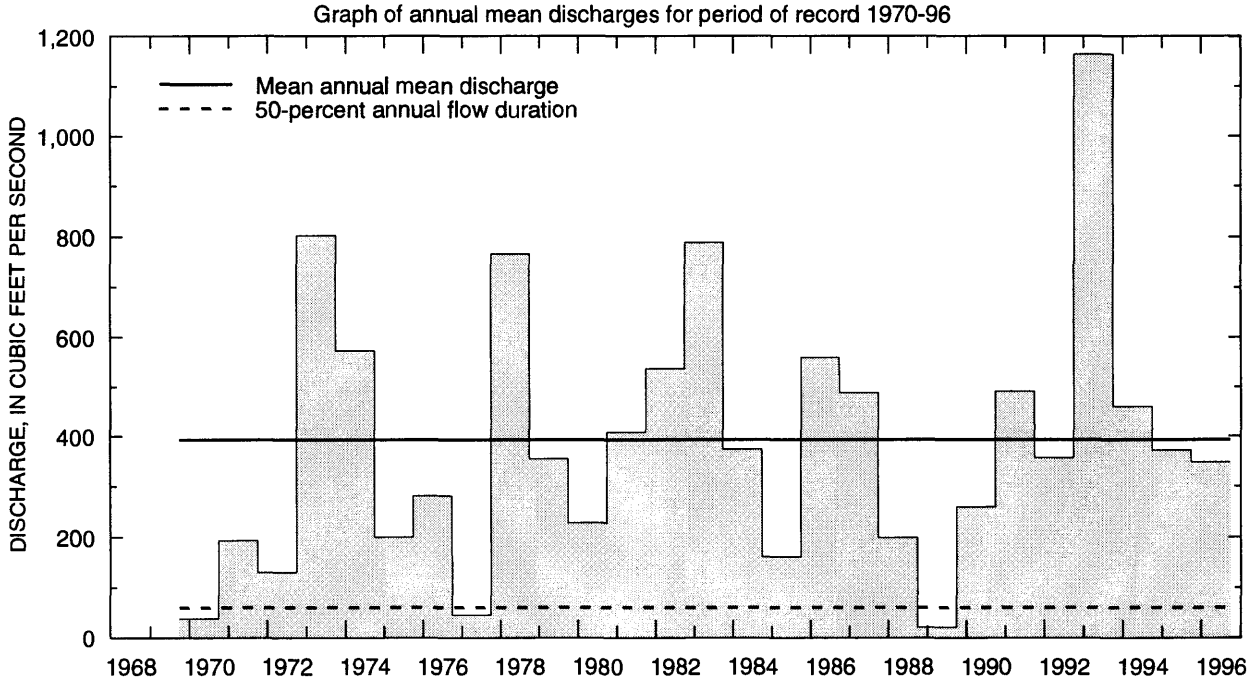
06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1970-96

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,790	1994	11.5	1975	301	410
November	1,828	1994	9.97	1975	311	466
December	1,364	1993	5.54	1970	413	430
January	1,546	1993	8.98	1970	257	397
February	1,550	1993	5.60	1970	344	478
March	1,271	1993	9.40	1970	425	348
April	1,132	1993	6.74	1970	355	307
May	1,281	1973	19.3	1977	411	330
June	1,573	1973	16.6	1988	467	382
July	1,162	1991	6.53	1970	560	415
August	1,826	1993	9.10	1970	511	556
September	1,707	1993	11.0	1974	347	437
Annual	1,164	1993	20.4	1989	392	267

Graph of annual mean discharges for period of record 1970-96



06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1970-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	8.2	5.7	5.3	7.8	4.5	7.5	1.1	8.0	8.8	5.5	8.1	9.2	6.1
95	11	11	11	11	8.4	11	12	18	12	8.4	11	11	11
90	13	13	16	16	12	17	16	21	17	11	11	12	14
85	15	16	17	18	18	18	20	22	20	18	15	16	18
80	17	17	18	19	18	22	21	23	21	21	18	20	20
75	19	19	20	21	20	26	25	24	23	23	20	21	21
70	20	20	22	21	22	36	36	32	30	24	22	22	23
60	24	23	28	29	28	55	58	97	195	139	28	24	30
50	29	29	94	31	31	200	128	300	402	414	95	28	60
40	41	40	378	40	61	421	261	520	589	788	582	61	301
30	295	315	601	111	240	636	622	737	758	1,000	1,000	496	607
25	566	425	745	208	520	814	726	755	787	1,120	1,160	644	769
20	787	663	996	444	842	913	783	777	806	1,190	1,200	802	826
15	846	852	1,160	775	1,150	1,040	820	815	829	1,220	1,230	916	1,040
10	877	1,170	1,190	1,070	1,440	1,150	857	825	1,170	1,250	1,260	1,200	1,200
5	1,220	1,260	1,460	1,480	1,490	1,460	1,180	1,210	1,280	1,290	1,500	1,260	1,310

Contact the U.S. Army Corps of Engineers, Kansas City District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

06903900 CHARITON RIVER NEAR RATHBUN, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1970 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.00	1.0	1.0	3.0	7.8	7.9	8.0	8.0	8.0
0.02	50	0.00	1.8	1.9	3.7	8.0	8.1	8.2	8.2	8.2
0.05	20	0.68	3.7	4.1	5.1	8.5	8.6	8.7	9.0	13
0.10	10	2.8	6.3	7.0	7.1	9.2	10	10	11	21
0.20	5	6.3	10	11	11	11	13	16	18	37
0.50	2	15	17	18	18	18	25	45	57	110
0.80	1.25	20	20	22	38	45	71	147	198	326
0.90	1.11	21	21	23	55	87	143	294	400	573
0.96	1.04	21	21	23	82	203	347	650	876	1,040
0.98	1.02	21	21	23	107	380	663	1,120	1,490	1,540
0.99	1.01	21	21	23	135	709	1,250	1,870	2,430	2,430

Magnitude and frequency of seasonal low discharges, based on period of record October 1969 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	1.3	3.0	4.0	5.3	0.64	1.5	1.9	2.6
0.02	50	2.2	3.3	4.3	5.9	1.2	2.2	2.9	4.0
0.05	20	4.4	6.0	6.5	7.3	2.5	4.0	5.3	7.7
0.10	10	7.4	8.0	9.0	9.3	4.6	6.6	9.0	14
0.20	5	11	11	12	13	8.4	12	17	27
0.50	2	23	23	27	34	19	35	56	97
0.80	1.25	36	54	80	123	31	91	178	333
0.90	1.11	40	97	167	285	35	147	325	623
0.96	1.04	42	200	415	793	38	237	612	1,200
0.98	1.02	42	337	802	1,650	39	318	917	1,820
0.99	1.01	43	560	1,520	3,360	40	412	1,320	2,640
		July-August-September				October-November-December			
0.01	100	1.9	1.9	1.9	1.9	0.00	3.2	3.2	3.2
0.02	50	2.8	2.8	2.8	2.8	0.00	4.1	4.1	4.1
0.05	20	4.9	4.9	4.9	4.9	3.9	6.1	6.1	6.1
0.10	10	7.9	7.9	7.9	8.4	7.0	8.6	8.7	9.0
0.20	5	12	12	13	17	10	11	12	15
0.50	2	18	24	39	65	18	21	28	47
0.80	1.25	30	72	153	289	27	51	92	178
0.90	1.11	40	151	350	661	32	89	196	393
0.96	1.04	56	378	924	1,660	37	173	490	978
0.98	1.02	71	735	1,820	3,060	40	278	944	1,830
0.99	1.01	89	1,410	3,450	5,390	43	439	1,780	3,310

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06904000 CHARITON RIVER NEAR CENTERVILLE, IOWA

LOCATION.—Lat 40°44'20", long 92°48'05", in SW1/4 NE1/4 NW1/4 sec. 14, T69N, R17W, Appanoose County, Hydrologic Unit 10280201, on left bank 10 ft downstream from bridge on State Highway 2, 3.0 mi east of Centerville and 3.5 mi downstream from Cooper Creek.

DRAINAGE AREA.—708 mi^2.

PERIOD OF RECORD.—May 1938 to September 1959 (discontinued).

GAGE.—Water-stage recorder and concrete control. Datum of gage is 825.68 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 21,700 ft^3/s, June 20, 1946, gage height, 24.20 ft, from flood mark; minimum daily discharge, 0.1 ft^3/s, October 11, 1938, September 30–October 3, 1940.

REMARKS.—Subsequent to September 1959, flow regulated by dam at Rathbun Lake (station 06903880).

Selected values from rating table number 2, developed October 1958
(A discharge measurement to validate this rating has not been made since October 1965)

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
2.5	8.5	10.0	2,360
3.0	36	12.0	3,220
3.5	158	14.0	4,200
4.0	370	16.0	5,380
5.0	760	18.0	6,900
6.0	1,080	20.0	9,000
8.0	1,630	22.0	11,600

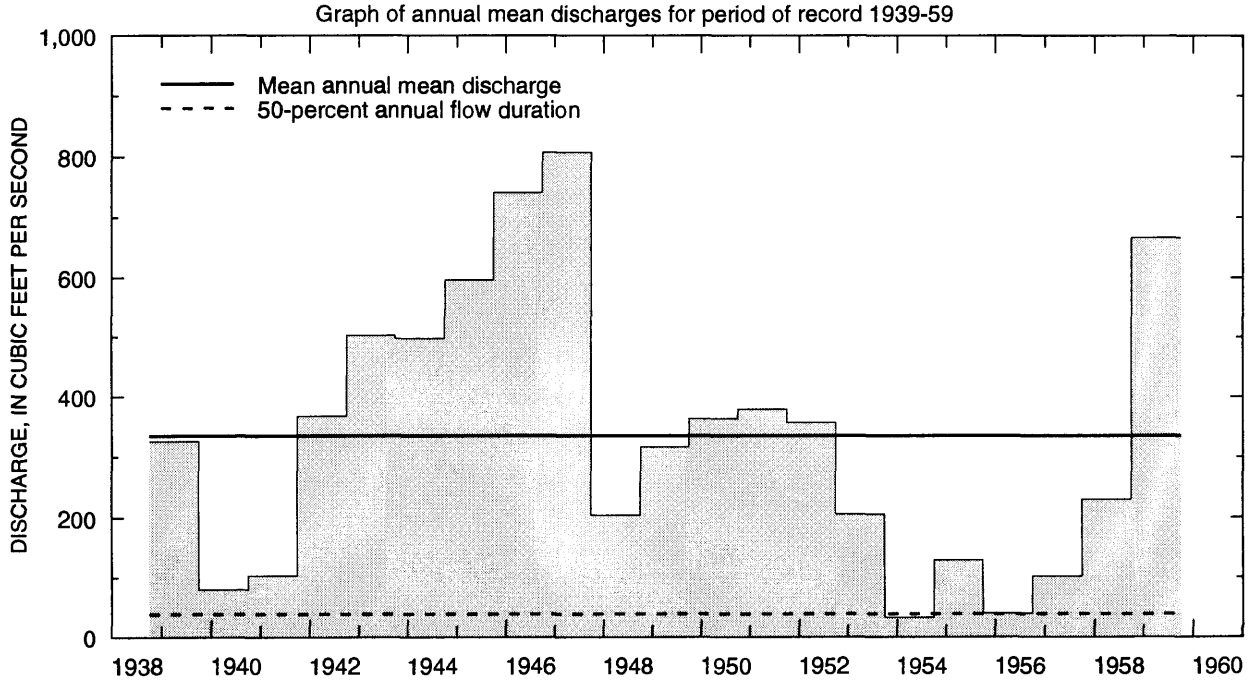
06904000 CHARITON RIVER NEAR CENTERVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1939-59

	Maximum		Minimum		Mean	
Period	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	610	1942	0.39	1957	108	174
November	761	1942	0.87	1957	94.8	174
December	468	1943	0.91	1956	87.3	146
January	1,461	1946	0.82	1956	151	326
February	1,071	1945	2.42	1954	347	318
March	1,920	1939	2.27	1956	693	617
April	2,429	1947	1.00	1956	594	692
May	2,234	1959	1.31	1956	541	666
June	4,665	1947	5.33	1956	937	1,116
July	939	1946	2.96	1954	194	236
August	694	1958	2.59	1953	201	225
September	427	1958	0.91	1953	91.9	132
Annual	807	1947	32.3	1954	335	231

Graph of annual mean discharges for period of record 1939-59



06904000 CHARITON RIVER NEAR CENTERVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1939-59

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	0.20	0.60	0.80	0.75	0.60	1.0	0.70	0.40	1.4	0.60	0.50	0.30	0.47
95	0.40	0.90	1.3	0.80	1.5	1.8	3.0	3.1	4.8	1.3	1.0	0.50	1.0
90	0.60	1.2	1.9	1.2	2.3	2.8	29	13	9.3	2.6	2.0	0.90	1.8
85	1.0	1.5	2.4	1.6	3.1	28	44	23	12	4.2	3.9	1.4	2.6
80	1.4	1.9	2.7	2.2	6.0	46	55	32	17	6.5	5.5	2.3	3.9
75	1.7	2.2	2.9	4.7	8.0	63	68	41	22	9.5	7.0	3.1	6.5
70	2.0	3.0	3.4	6.7	9.6	89	84	51	26	13	8.6	4.1	9.5
60	2.8	5.8	7.4	13	24	140	122	87	47	20	12	6.6	20
50	4.2	13	14	23	68	226	162	128	103	31	20	10	38
40	9.1	18	27	38	122	382	220	191	223	55	38	14	72
30	22	49	42	56	211	658	364	286	494	85	74	24	132
25	33	72	54	70	311	930	466	368	760	109	102	36	186
20	55	109	69	91	483	1,150	693	496	1,250	156	165	54	276
15	95	141	88	126	700	1,640	1,120	780	2,030	242	286	79	454
10	240	203	114	211	1,260	2,060	1,740	1,360	2,990	477	534	186	859
5	758	385	284	520	1,910	2,730	2,930	2,350	4,450	944	1,340	465	1,860

Magnitude and frequency of instantaneous peak discharges, based on an effective record length of 34 years[a]

Exceedance probability	Recurrence interval (years)	Discharge (ft^3/s)
0.99	1.01	712
0.95	1.05	1,380
0.90	1.11	1,940
0.80	1.25	2,890
0.50	2	6,010
0.20	5	12,000
0.10	10	16,800
0.04	25	24,000
0.02	50	29,900
0.01	100	36,300
0.005	200	43,200

[a] Analysis includes area-weighted peak discharges (1960-69) computed from station 06903900 Chariton River near Rathbun.

Magnitude and frequency of annual high discharges, based on period of record 1939-59

Exceedance probability	Recurrence interval (years)	Maximum average discharge (ft^3/s) for indicated number of consecutive days			
		3	7	15	30
0.99	1.01	530	321	218	133
0.95	1.05	1,030	694	474	292
0.90	1.11	1,440	1,010	690	429
0.80	1.25	2,140	1,550	1,050	661
0.50	2	4,380	3,230	2,120	1,370
0.20	5	8,510	6,040	3,760	2,500
0.10	10	11,800	8,040	4,850	3,280
0.04	25	16,500	10,600	6,150	4,230
0.02	50	20,300	12,500	7,040	4,900
0.01	100	24,300	14,300	7,870	5,530
0.005	200	28,500	16,100	8,640	6,130

06904000 CHARITON RIVER NEAR CENTERVILLE, IOWA—Continued

Pre-regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1939 to March 1959

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	0.04	0.04	0.07	0.13	0.20	0.20	0.20	0.21	0.22
0.02	50	0.06	0.07	0.10	0.18	0.31	0.31	0.34	0.36	0.45
0.05	20	0.11	0.13	0.18	0.28	0.47	0.57	0.72	0.78	1.2
0.10	10	0.19	0.22	0.29	0.43	0.70	0.99	1.4	1.5	2.8
0.20	5	0.36	0.42	0.54	0.73	1.2	1.9	3.1	3.5	7.1
0.50	2	1.2	1.4	1.7	2.1	3.4	7.2	13	16	35
0.80	1.25	3.8	4.2	4.9	6.4	11	28	54	71	132
0.90	1.11	6.9	7.3	8.7	12	21	56	109	152	241
0.96	1.04	13	13	16	23	44	121	229	337	428
0.98	1.02	19	19	23	35	73	198	366	561	597
0.99	1.01	26	26	32	53	117	311	555	882	890

Magnitude and frequency of seasonal low discharges, based on period of record June 1938 to September 1959

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	0.15	0.18	0.18	0.18	0.29	0.32	0.35	0.68
0.02	50	0.25	0.29	0.31	0.33	0.47	0.57	0.70	1.4
0.05	20	0.50	0.61	0.66	0.80	0.99	1.3	1.9	4.0
0.10	10	0.92	1.1	1.3	1.7	1.9	2.7	4.1	9.2
0.20	5	1.9	2.4	2.7	4.1	3.9	5.8	9.7	23
0.50	2	7.3	9.0	11	20	14	22	40	109
0.80	1.25	26	31	39	87	48	66	118	373
0.90	1.11	51	58	73	180	85	108	187	635
0.96	1.04	100	109	139	377	153	172	281	1,030
0.98	1.02	153	162	209	596	219	226	352	1,360
0.99	1.01	224	229	298	888	300	340	421	1,700
		July-August-September				October-November-December			
0.01	100	0.04	0.14	0.18	0.41	0.03	0.09	0.14	0.18
0.02	50	0.07	0.21	0.26	0.58	0.05	0.13	0.19	0.25
0.05	20	0.14	0.35	0.45	0.98	0.10	0.23	0.31	0.44
0.10	10	0.27	0.57	0.73	1.6	0.20	0.38	0.51	0.75
0.20	5	0.57	1.0	1.3	2.9	0.45	0.74	0.93	1.5
0.50	2	2.1	2.9	4.2	9.3	2.0	2.7	3.3	5.8
0.80	1.25	6.6	8.3	14	33	8.6	11	14	26
0.90	1.11	11	14	26	65	18	24	30	61
0.96	1.04	20	25	51	137	39	55	74	155
0.98	1.02	28	36	79	225	63	95	134	292
0.99	1.01	37	50	118	354	97	158	235	523

06904010 CHARITON RIVER NEAR MOULTON, IOWA

LOCATION.—Lat 40°41'30", long 92°46'15", in SE1/4 NE1/4 sec. 14, T68N, R17W, Appanoose County, Hydrologic Unit 10280201, on right bank 6 ft downstream from bridge on County Highway J45, 0.7 mi downstream from Hickory Creek, 5.0 mi west of Moulton, 8.0 mi upstream from Iowa-Missouri border, 20.8 mi downstream from Rathbun Dam, and at mile 121.5.

DRAINAGE AREA.—740 mi^2.

PERIOD OF RECORD.—August 1979 to September 1996.

GAGE.—Water-stage recorder. Datum of gage is 800.00 ft above sea level (U.S. Army Corps of Engineers benchmark).

EXTREMES FOR PERIOD OF RECORD.—Maximum instantaneous discharge, 11,200 ft^3/s, July 16, 1982, gage height, 36.83 ft; minimum daily discharge, 14 ft^3/s, June 22, 23, 27, July 9, 1988.

REMARKS.—Flow regulated by dam at Rathbun Lake (station 06903880) 20.8 mi upstream.

Selected values from rating table number 4, developed October 1994

Gage height (ft)	Discharge (ft^3/s)	Gage height (ft)	Discharge (ft^3/s)
17.6	7.60	24.0	1,120
18.0	23.7	27.0	1,830
19.0	111	30.0	2,800
20.0	273	33.0	4,820
22.0	709	37.0	8,650

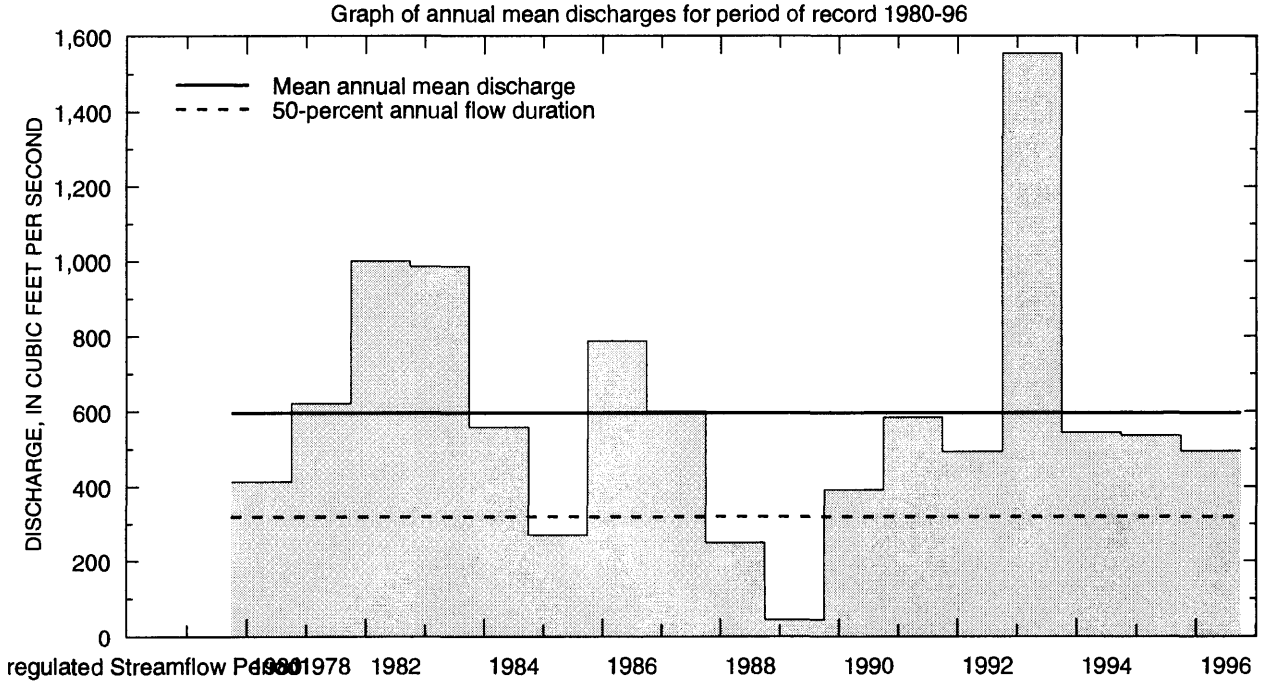
06904010 CHARITON RIVER NEAR MOULTON, IOWA—Continued

Regulated Streamflow Period

Statistics of monthly mean and annual mean discharges, based on period of record 1980-96

Period	Maximum		Minimum		Mean	
	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Water year of occurrence	Discharge (ft^3/s)	Standard deviation (ft^3/s)
October	1,874	1994	24.2	1989	458	533
November	1,931	1994	23.0	1989	458	548
December	1,557	1983	20.1	1990	541	514
January	1,696	1993	22.2	1989	348	518
February	1,773	1983	20.6	1989	475	539
March	1,831	1993	24.3	1989	658	505
April	1,481	1993	22.7	1989	629	506
May	1,421	1995	33.0	1980	673	444
June	1,341	1980	20.3	1988	637	381
July	2,849	1982	17.9	1988	973	797
August	2,004	1993	21.0	1988	733	622
September	1,976	1993	26.6	1988	554	575
Annual	1,555	1993	43.6	1989	596	345

Graph of annual mean discharges for period of record 1980-96



06904010 CHARITON RIVER NEAR MOULTON, IOWA—Continued

Regulated Streamflow Period

Monthly and annual flow durations, based on period of record 1980-96

Percentage of days discharge equaled or exceeded	Discharge (ft^3/s)												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual
99	21	18	17	19	19	19	22	18	15	16	17	21	17
95	24	23	19	23	21	27	23	23	21	18	20	26	22
90	25	26	23	27	27	48	38	29	27	23	25	27	26
85	26	27	25	31	35	60	46	34	35	29	29	28	30
80	27	29	33	35	37	70	55	43	50	45	37	30	36
75	29	33	52	39	42	91	66	56	111	105	41	32	42
70	32	37	61	43	47	115	76	113	265	352	50	33	51
60	38	48	95	50	56	250	134	353	476	644	294	41	92
50	55	86	280	60	83	421	305	642	632	822	771	88	320
40	304	234	480	80	249	675	645	781	769	1,160	1,040	488	640
30	776	629	774	273	627	928	869	838	812	1,250	1,210	833	843
25	826	865	1,050	404	820	1,140	920	862	835	1,290	1,230	862	926
20	864	896	1,200	634	1,070	1,250	1,010	901	857	1,300	1,260	1,170	1,160
15	1,060	1,090	1,260	970	1,280	1,310	1,260	963	927	1,340	1,280	1,260	1,260
10	1,240	1,260	1,540	1,530	1,560	1,560	1,560	1,190	1,040	1,820	1,580	1,520	1,480
5	1,900	2,000	1,600	1,600	1,710	1,790	1,950	2,120	1,380	2,730	1,880	1,930	1,870

Contact the U.S. Army Corps of Engineers, Kansas City District, for the magnitude and frequency of instantaneous peak discharges and magnitude and frequency of annual high discharges.

06904010 CHARITON RIVER NEAR MOULTON, IOWA—Continued

Regulated Streamflow Period

Magnitude and frequency of annual low discharges, based on period of record April 1980 to March 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	11	11	11	11	11	11	11	11	11
0.02	50	12	12	12	12	12	12	12	12	16
0.05	20	14	15	17	17	17	17	17	21	28
0.10	10	16	17	17	17	18	20	25	33	47
0.20	5	18	19	19	19	21	26	42	56	84
0.50	2	24	26	26	28	33	51	112	158	236
0.80	1.25	33	35	45	65	83	137	302	428	600
0.90	1.11	39	41	66	125	168	267	511	713	938
0.96	1.04	47	48	112	299	423	606	901	1,220	1,470
0.98	1.02	53	54	166	581	851	1,100	1,300	1,710	1,930
0.99	1.01	60	60	247	1,130	1,710	1,960	1,990	2,310	2,440

Magnitude and frequency of seasonal low discharges, based on period of record September 1979 to September 1996

Nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft^3/s) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	13	13	13	13	7.1	7.1	7.1	7.1
0.02	50	14	14	14	14	7.7	7.7	7.7	7.7
0.05	20	17	17	17	17	11	11	11	16
0.10	10	20	20	20	20	16	16	18	29
0.20	5	23	25	25	28	22	25	32	58
0.50	2	32	40	53	65	40	65	103	196
0.80	1.25	77	106	169	226	87	208	348	582
0.90	1.11	161	223	372	516	142	413	674	977
0.96	1.04	448	599	1,010	1,430	258	918	1,390	1,630
0.98	1.02	995	1,270	2,100	3,000	395	1,590	2,250	2,270
0.99	1.01	2,240	2,680	4,300	6,180	595	2,680	3,480	3,500
		July-August-September				October-November-December			
0.01	100	7.5	7.5	7.5	7.5	10	10	10	10
0.02	50	7.7	7.7	7.7	7.7	11	11	11	11
0.05	20	9.8	9.8	9.8	11	12	12	12	12
0.10	10	14	14	15	21	15	15	15	17
0.20	5	19	21	25	43	18	20	23	29
0.50	2	30	56	86	176	32	45	62	95
0.80	1.25	76	218	363	684	69	149	223	350
0.90	1.11	160	522	852	1,370	114	329	494	733
0.96	1.04	430	1,510	2,290	2,830	208	870	1,270	1,680
0.98	1.02	918	3,240	4,510	4,530	319	1,760	2,460	2,950
0.99	1.01	1,970	6,750	6,790	6,800	483	3,490	4,640	4,970

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